NATURE STUDY LESSONS

BIRD STUDIES

ILLUSTRATED
IN
NATURAL COLORS

by
G. A. CORNISH, B.A.

RB170, 213

Presented to the

LIBRARY *of the*

UNIVERSITY OF TORONTO

by

F. David Hoeniger

L. A. Larson

NATURE STUDY LESSONS

Digitized by the Internet Archive
in 2016 with funding from
University of Toronto

https://archive.org/details/naturestudylesso00corn

NATURE STUDY LESSONS

FOR

TEACHERS and STUDENTS

BY

G. A. CORNISH, B.A.

Lecturer in Science, Faculty of Education, University of Toronto.

BIRD STUDIES

Based on the class-room work of the author

EMBRACING

Birds, Bird-Food, Beaks, Claws, Eggs and Migration

Illustrated

Dominion Book Company

Toronto, Canada

1914

Copyright, Canada, 1914
By
W. O. McIndoo

PREFACE

Birds have always been the favorite topics for nature study work in the public schools. The methods used have not always been above criticism. The chief aim in teaching the pupils these lessons, is to develop an interest in bird life. The only way to develop this real and vital interest is by getting the pupils to observe the common birds in their natural habitat. The purpose of this little book is to assist the teacher in this useful work. Thirty-one topics have been selected which cover all departments of bird study. The birds chosen for treatment are those that are easy to find, and suitable for observations by school children. Not only have individual birds been dealt with, but other topics, such as bird food, the beaks, the eggs and migration have been covered. Each bird selected is typical of a large number. I have felt that it is much better to treat a small number fully, than to give a smattering of a larger number.

One of the most irritating things that a teacher meets in a book is a series of questions where he looks for information. I have tried in every case to ask no question for which an answer will not be found in the text. Each lesson is divided into two parts; first a series of observations to be made by the pupils, in which questions are asked; secondly directions to the teacher. In this last part, complete statements of the facts to be observed by the pupils are placed, so when the teacher gives the direction to the pupils, the answer to each direction is to be found in the text, so that the teacher can at once state whether the pupils' observations are correct or not.

It is not expected that each pupil will succeed in making all the observations indicated, but the work of the combined members of the class should supply a fairly complete answer to all the observations asked.

Toronto, Feb. 28, 1914. GEORGE A. CORNISH.

BIRDS.

The old bob white, and chipbird;
The flicker and the chee-wink,
The little hopty-skip bird,
Along the river brink.

The blackbird and the snowbird,
The chicken hawk and the crane;
The glossy old crow-bird,
The buzzard, down the lane.

The yellowbird and redbird,
The tom-tit and the cat;
The thrush and that redhead bird,
The rest's all pickin' at!

—*James Whitcomb Riley.*

CONTENTS

Page.

PREFACE v

BIRDS (POEM) vi

LIST OF COLORED ILLUSTRATIONS xi

THE CALL OF THE WILD (POEM) xii

JOHN JAMES AUDUBON xiii

UNPAID HELPERS (POEM) xiv

THE USES OF BIRDS xv

LESSON 1.—THE WISE OLD CROW 1
1. Introduction 1
2. Form, Size, and Color 1
3. Locomotion and Song 2
4. Food and Economic Importance 2

THE CROW (POEM) 4

LESSON 2.—THE CROW—HIS NEST AND HIS WINTER HOME 5
1. Nesting Habits 5
2. Migration and General Habits 6
3. The Crow's Relations 7

STARLING FAMILY 7

OUR GOOD NEIGHBORS (POEM) 8

THE ROBIN (POEM) 9

LESSON 3.—THE ROBIN—ITS COLOR AND SONG 9
1. Introduction 9
2. General Appearance of the Bird 10
3. Its Notes and Songs 11

REMORSE (POEM) 12

THE SECRET (POEM) 13

LESSON 4.—OUR MOST FAMILIAR BIRD'S NEST—THE ROBIN'S 13
1. Nesting Habits 13

Lesson 5.—Is the Robin a Useful Bird? 15
1. Its Food 15
2. Its Migration 16
3. The Other Thrushes 17

The Wood Thrush (Drawing) 18

Lesson 6.—The Woodpeckers—How to Distinguish Them 19
1. Table By Which the Common Woodpeckers are Identified 19
2. Appearance of Bird 20
3. The Climbing Habits 20

Somebody's Knocking (Poem) 21

Redheaded Woodpecker (Poem) 22

Lesson 7.—What Woodpeckers Do On the Tree Trunks 23
1. Feeding Habits 23
2. Flying Habits 23
3. Song of Woodpeckers 24

Lesson 8.—A Nest in a Tree Trunk 25
1. Nesting Habits 25
2. General Habits and Economic Importance 26

Prominent Members of the Woodpecker Family 27

Bird Record (Drawing) 28

Lesson 9.—School Records of Bird Migration 29
1. Introduction 29
2. Records 29

Lesson 10.—Classification of Migrating Birds 31
1. Classes of Migrants 31

Lesson 11.—The Birds on the March 33
1. Methods of Migration 33

Lesson 12.—The How and Why of Bird Migration 35
1. Migration Routes 35
2. Purposes of Migration 36

To a Water-Fowl (Poem) 38

Lesson 13.—Our Smallest Bird—The Ruby-Throat 39
1. General Appearance and Coloration 39
2. Method of Locomotion 40

Lesson 14.—The Hummingbird's Habits 41
1. Food and Economic Importance 41
2. Nesting Habits 42
3. Migration and General Habits 43

CONTENTS.

The Swallow (Poem) 44

Lesson 15.—The Swallows and Their Graceful Flight 45
1. Introduction 45
2. General Appearance of Bank Swallow 45
3. Locomotion and Food 46

Lesson 16.—A Cosmopolitan Bird With a Home in a Sandbank—The Swallow 48
1. Nesting Habits 48
2. Migration and General Habits 49

Lesson 17.—Birds' Eggs—Their Shape, Size and Number 51
1. Shape, Size, and Number of Eggs 51

Lesson 18.—Have the Beautiful Colors of Birds' Eggs a Meaning? . . . 53
1. Color of Birds' Eggs 53

The Hen (Halftone) 55

Lesson 19.—The Mysteries of a Hen's Egg 55
1. Introduction 55
2. Study of a Hen's Egg 56

Grosbeaks (Poem) 58

Lesson 20.—Visitors From the North—The Grosbeaks 59
1. Introduction 59
2. The Pine Grosbeak 59
3. The Evening Grosbeak 60

Lesson 21.—The Rose-Breasted Grosbeak 61
1. The Rose-Breasted Grosbeak 61
2. Its Cousin—The Cardinal Bird 62
3. Other Relatives 63

The Sparrow (Poem) 63

Beaks and Claws (Drawing) 64

Lesson 22.—The Bird's Most Useful Tool 65
1. Introduction 65
2. The Structure and Use of the Beak 65

Crossbill (Drawing) 66

Lesson 23.—The Varied Forms of Beaks 67
I. The Forms and Use of the Beak in Different Birds 67
1. Hen's Beak 67-68
2. The Duck 67-68
3. The Sparrows 67-68
4. The Chickadee and Brown Creeper 67-69

Duck and Grebe (Drawing of Head and Foot) 69

Lesson 24.—More Beaks 70
1. Night Hawk, Chimney Swift, and Swallow 70-71
2. Kingfisher 70-71
3. Spotted Sandpiper 71-72
4. The Hawk and Owl 71-72

Fowl; Hawks and Owls (Drawing of Head and Foot) 72

Lesson 25.—The Horned Lark 73
1. Method 73
2. Colors and Structures 73
3. Locomotion 74
4. Feeding Habits 75

The Horned Lark (Drawing) 76

Lesson 26.—Nest and Song of the Horned Lark 77
1. Its Song 77
2. Nesting Habits 78
3. Migration and Other Habits 78

The Chickadee (Poem) 80

Lesson 27.—The Chickadee—Its Song and Flight 81
1. Introduction 81
2. Colors and Form 81
3. Song 82
4. Means of Locomotion 82

Lesson 28.—The Chickadee a Friend of Man 83
1. Food and Economic Importance 83
2. Breeding Habits 84
3. Migration and General Habits 84
4. The Related Climbers 85

The Birds Must Know (Poem) 85

Inroads Through Our Forests 86

Winter (Poem) 87

Lesson 29.—What Food Do Birds Find in the Trees in Winter? 87

Lesson 30.—Bird Food in the Winter Fields 90
1. Introduction 90
2. Food to be Found in Fields 90

Lesson 31.—Food in the Icy Waters 92
1. Food to be Found in the Water 92
2. Food From Other Sources 93

APPENDIX

Bird Drawing (showing parts) 94
The Duckshooter's Rubaiyat (poem) 95
Ducks 96

LIST OF COLORED ILLUSTRATIONS

American Crow ..... opposite page 1
American Crow's Nest ..... " " 5
Robin ..... " " 9
Wood Thrush ..... " " 18
Flicker ..... " " 20
Ruby-throated Hummingbird ..... " " 39
Barn Swallow ..... " " 44
American Woodcock's Nest ..... " " 51
Cedar Waxwing's Nest ..... " " 53
Horned Lark ..... " " 76
Chickadee ..... " " 83

THE CALL OF THE WILD

The call of the wild hath charm for me
'Mid green woods, bright flowers alone and free,
Over the hills across the green lea,
I wander in dream as it used to be.

The call of the wild comes back to me
In the office or shop, where ere I be,
Through the mist of years the past I see
As real in dream as it used to be.

The call of the wild, my boyhood free,
The song of the bird, the hum of the bee,
My dog and gun, sweet mem'ries to me,
A dream I love of the used to be.

REFRAIN.

The song of the bird, the hum of the bee,
Flowers are shedding their beauty for me;
Scenes of the wildwood, a life ever free,
My heart in its dream is longing for thee.

J. E. WALL.

JOHN JAMES AUDUBON

1780—1851.

John James Audubon, one of the world's eminent ornithologists, was born near New Orleans, Louisiana, more than a century and a quarter ago; that is to say, on May 4th, 1780. His magnificent work, "The Birds of America," in ten volumes, was completed nearly four score years ago. That work has been an inspiration to those who, in these later years, have seen the birds Audubon knew and loved so well, disappearing not only as to number, but as to species. It has made his name a rally-cry for bird-lovers under the auspices of a society that has done good work in the past and that promises to do a better work in the future for the protection and preservation of native and migratory birds the world over.

Less than twenty-five years ago the Audubon movement was regarded by the thoughtless and careless majority as a sentimental fad. As it grew it was antagonized by every selfish interest affected, or likely to be affected, by the restrictions for which it stood and pleaded. The hunter was no less bitter in his opposition to it than the trader in plumage. Sympathies of those who should have been with it were set against it. The worst enemy it had to contend with was public indifference; next to this was public contempt. There was a time, strange to say, when to be a pronounced friend of the bird was to incur ridicule and the abuse of people who thought such a cause beneath the dignity of manliness and womanliness.

A great awakening was necessary in order that the mass of the people might see the practical side of the question. And it came. It came with the rapid disappearance of forest birds, prairie birds, field birds, shore birds, sea birds, birds of plumage, native and foreign. Within the seventy-odd years since Audubon's volumes were given to the world, not only have myriads of birds been ruthlessly destroyed, but numerous species have been annihilated.

There is no cause for discouragement, however. The fact that the question of bird protection has at length forced its way into the legislative halls is not to be underrated. It carries with it the weighty assurance that the country is becoming aroused to a realization of the situation. It also carries with it the satisfying assurance that the question is now touching the business interests of those who have been proof through all these years against moral argument. Doubtless the movement had to take this course, and doubtless, now that it has taken it, the steps at which the law-making powers have long hesitated will soon be taken.

UNPAID HELPERS

You call them thieves and pillagers; but know
They are the winged wardens of your farms,
Who from the cornfields drive the insidious foe,
And from your harvest keep a hundred harms;
Even the blackest of them all,—the crow,—
Renders good service as your man-at-arms,
Crushing the beetle in his coat of mail,
And crying havoc on the slug and snail.

—*Longfellow.*

THE USES OF BIRDS

The two greatest enemies of the agriculturist are insects and weeds. There is no part of a plant that the former will not attack. They burrow in the roots and sap the vitality of this food-absorbing organ; they pierce even the hardest, driest bark of a tree and fatten on the pulpy, succulent tissues beneath; the leaves are their favorite fare, while the seeds and fruit, with their abundant supply of concentrated food laid up for the use of the growing seedling, is as nutritious to baby insects as to baby plants. As a result, no matter whether the plant is raised for its root, stem, leaves, seeds or fruit, it is continually attacked by these greedy eaters. At the very smallest estimate, 10 per cent. of all crops are destroyed by this source. Where a farmer now reaps 10 bushels of grain or picks 10 barrels of fruit, if the insect pests could be banished he could increase this output by 1 bushel or 1 barrel, as the case may be.

Weeds are almost as harmful. The seeds that are carried in various ways to the land grow up with the crop, compete with it for food, and diminish materially the number and vigor of the plants.

Lime sulphur, Paris green, Bordeau mixture will do much, but the farmer has an ally more potent far, than all of these combined, which he is altogether too slow to recognize—the birds. Through indiscriminate slaughter, unkind treatment, and disturbance of natural conditions they have been so greatly diminished that they are no longer able to keep the insects and weeds successfully in check. There is not a shadow of doubt that if our insectivorous birds were more numerous in species and individuals the vegetable crops would be greatly increased.

Few realize the great numbers of insects and grubs that are eaten by a single bird. A wren will feed its young several thousand times each day; a nestling robin will devour almost its own weight of insects each day; the number of eggs, larvae and adult insects that a chickadee will pick from bark and leaves, or a woodpecker will chisel out from under the bark, is beyond belief. The numbers of weed-seeds destroyed by sparrows and finches is pro-

digious, and must greatly lessen the number of seeds that are left to grow in the tilled soil; and if these birds became still more numerous their benefit in this direction would be much more marked.

The great concern of our people should be, not the destruction of our feathered friends, but the undertaking of methods of enticing them back to populated regions. How can this be done? In a variety of ways: every citizen should feel it a duty to the state to see that the laws for bird protection are rigidly enforced; the cat and the English sparrow are the two chief enemies of birds, particularly in towns and cities, and a ceaseless war should be waged on these two pests of our civilization; nesting places for wrens, flickers, swallows and martins can be set up in the trees, and they are likely soon to be occupied; our wild shrubs and trees having berries on them should be protected so as to supply fruits for robins and other useful birds to eat, so that there will not be the same inducement to do some thieving in the farmer's orchard; a little uncleared land, a creek wooded along the banks, and a scattered tree here and there are bound to attract the birds, as well as to add to the beauty of the landscape, and the land given to such a purpose is bound to yield rich rewards; a drink-trough in the yard will help to slake the thirst of many a little bird, and serve its turn in attracting them to repay you by destroying their quota of injurious insects.

AMERICAN CROW
½ Life-size.

Lesson 1.

THE WISE OLD CROW

1. INTRODUCTION.

The crow is probably the best known bird in Canada in respect to both its appearance and its call. It is well adapted for nature study work as it is accessible and easy to observe. Almost any season, except the middle of winter, is a good time to begin. It is probable that some member of the class has or has had a tame crow and can provide some interesting information about its habits. A crow's nest can be provided for the school museum by some of the boys and it should be no difficult task to develop much interest in this most intelligent member of the feathered family.

2. FORM, SIZE AND COLOR.

(a) Observations to be made by pupils.

How many times as long as a robin is a crow?

The robin is 10 inches long—estimate in inches the length of the crow.

What is the color of the crow?

Is there any part of it—beak, eyes or feet—that is a different color?

Notice any metallic reflections.

Look out for birds similar to the crow and mingling with them but much larger.

Is the beak strong or weak?

Describe the feet.

(b) To the teacher.

The crow is about 19 inches long—twice as long as a robin. The whole body is a proverbial black even to the beak and feet. The eyes themselves are black. The upper parts have metallic reflections of a steel blue color. The under surface is duller than the back. The beak is so strong that the crow has no successful enemies. The feet are also strong, with four toes—three in front and one behind. The northern raven, very much larger than the crow, is often seen amongst his smaller cousins.

3. LOCOMOTION AND SONG.

(a) Observations to be made by pupils.

Observe how the crow moves on the ground—does it walk or hop?
Does it fly smoothly or jerkily?
Where does it usually light?
What is its usual call?
Does it give this call when flying or at rest?
Has it any other sound?
Study carefully flocks of crows in a field and decide if you think they have a language.
Try to understand their language.
If any have pet crows, let them report on the different calls stating when each is given.
If a nest can be found, notice if the young crows are noisy.

(b) To the teacher.

The call of the crow is so well known that it needs no mention. Its "caw, caw" is given either while flying or at rest in a tree. Anybody who studies crows carefully will soon be struck by the various sounds they can make and will be convinced that they have a language of their own; but very few have studied the crow patiently enough to interpret that language. He flies strongly and steadily and is capable of moving with great speed. He walks over the ground with his strong feet, looking for food; he can also hop like a robin. The young are very noisy.

4. FOOD AND ECONOMIC IMPORTANCE.

(a) Observations to be made by pupils.

What food do crows seek on the ground?
Do they search the ground when no farmer's seed is there to be eaten?
What complaint has the farmer against them?
How are they injurious to other birds?
What harm do they do to poultry?
At what seasons do they injure the crops?
What is their food at other seasons?

Find from reading what they visit the Atlantic coast in Autumn for.

Write out a list of ways they are injurious and the ways they are beneficial.

From your observation, would you decide that, on the whole, crows are injurious or beneficial?

Consult some intelligent farmer as to how he can protect his seed corn from the crows.

(b) To the teacher.

The farmer is a sworn enemy of the crow; he considers him a thief and a villain. He is an Ishmael amongst birds, his hand is against every bird and every bird's hand is against him. But he does not worry over his evil reputation, he seems to enjoy it. He eats a good deal of the germinating corn when it becomes soft, and the farmer occasionally has to replant his crop. He also attacks the milky corn when in the ear. Much more villainous than either of these is his habit of eating birds' eggs and nestlings, and what makes him still more hateful to the agriculturist is his appetite for young chickens. This is a formidable indictment against his black knightship. But the dark cloud has a silver lining. For nine-tenths of the season he is searching the meadows for insects and eats prodigious numbers of them. Of course he is not an economic entomologist and does not distinguish the beneficial from the harmful ones. He also eats field mice and other rodents which is to his credit, but he also devours toads and frogs the former of which are the farmers' friends, though not always recognized as such. He also can scent a dead animal from afar and plays the part of a scavenger. On the whole then, the balances are weighed pretty evenly, so let us give such a shrewd old chap the benefit of the doubt. Of course he does not need our good opinion as he is quite able to look after himself as every farmer knows who has endeavored to seek revenge on him with a shotgun. The farmer can make his seed corn distasteful by tarring it. In autumn, when food becomes scarce, crows seek the Atlantic coast to gorge upon the delicate shell fish found on the beach at low tide.

THE CROW

The wise old crow is a wily old crow,—
And the blackest of all bird creation!
No light speck or streak, marks coat, feet, or beak,—
Black eyes—and a black reputation!

'Though sombre his gown, and of shady renown,
Yet, the crow seems never dejected,
With his caw, caw, caw, he says that by law
The crows should be fully protected.

He thinks that to eat of young corn so sweet
Should not be so sadly lamented;
Since he gorges on bugs, field mice, and slugs,
The farmers should be quite contented!

—*W. O. M.*

FROM COL. CHI. ACAD. SCIENCES.

573

NEST OF THE AMERICAN CROW.

(Corvus americanus)

COPYRIGHT 1903, BY A. W. MUMFORD, CHICAGO.

Lesson 2.

The Crow—

His Nest and His Winter Home

1. NESTING HABITS.

(a) Observations to be made by pupils.

At what season are you able to find the nests?
Where is the nest usually built?
How high from the ground is it?
In the autumn get a nest and bring it to school and describe its structure.
Describe the number and color of the eggs.
How long does incubation last?
Try to find out the food of the young.
Is the same nest used more than once?

(b) To the teacher.

The crows begin to construct their nests in April or May. The nest is a large but well constructed home. It looks a little rough exteriorly but forms a quite comfortable abode for young crows. The main structure is of interwoven sticks, but the interior is lined with the soft bark of the grape vine, grass and moss. It is found well up in a tree, usually located in a woods, but never in the deep forest. Most boys know that it is not easy to approach from below. Both parents help in the tedious work of incubation. Four to six ovate eggs are laid. These eggs are usually bluish green, marked with shades of brown, but the colors vary to a great extent. After eighteen days hatching, four blind and naked crow babies make their appearance, but in three weeks of steady eating, the well feathered fledglings, with eyes wide open, are ready to leave the nest. Like most young birds, a meat diet is largely used; insects, alternating with frogs and mice, make a very good variety for a crow. The wise old crow shows her wisdom by utilizing the same nest for several seasons. There is no divorce in the kingdom of crowdom for when they are mated it lasts for life.

2. MIGRATION AND GENERAL HABITS.

(a) Observations to be made by pupils.

Do any crows remain throughout the winter?
At what period in the spring do crows appear?
Do they come in flocks?
At what season are they seen in the largest flocks?
When do they depart?
What kind of perches do they light on?
Do they migrate during the day or night?
State ways in which they show their superior intelligence.
Inquire from old settlers if the crows have increased or diminished in numbers.

(b) To the teacher.

The crows remain in small numbers throughout the winter. They pick up what food they can find, but the majority are giving our farmers a rest and are worrying the southern agriculturist by rooting up his peanuts or cropping the rice. They return early in April to survey the most likely corn fields. They are usually found in flocks of from fifty to one hundred. During the autumn they collect in the evening in immense flocks to roost and each morning scatter over a large area to forage for food. The bird is defiant in its fearlessness. Though no laws protect him, and the farmer is ever on his trail with a shotgun, he perches in the most conspicuous places, swarms the open fields and migrates in broad daylight. He depends on his wariness to outwit the farmer, and the story of how he detects a shotgun and avoids it, more than establishes his reputation. Though an outlaw, and attacked with guns, traps and poison, he thrives in well-settled districts and the universal testimony is that he is becoming more numerous with the settling up of the country. Really the best thing to do is to treat him philosophically, consider him a necessary evil (if evil he is) and settle down and enjoy him. For after all he is a most intelligent and entertaining gentleman and, if he recognizes you as a friend, will condescend to treat you with respect and allow the inquisitive naturalist to inquire into all his ways at close range.

3. THE CROW'S RELATIONS.

The grackles and orioles are the nearest relations of the crows. The pupils should observe their habits and compare them with those of the crow. The sets of questions on the crow will, to a large extent, fit these other members of a nearly related family.

STARLING FAMILY.

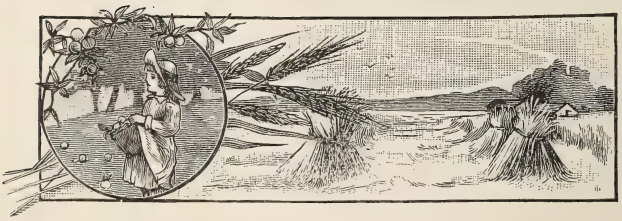
Audubon's oriole.
Baltimore oriole.
Blue-jay.
Bobolink.
Bronzed grackle.
Canada jay.
Clarke's nutcracker.
Cow-bird.
Crow.
Long-crested jay.
Meadow-lark.
Orchard oriole.
Raven.
Red-winged blackbird.
Rusty blackbird or grackle.
Starling.
Yellow-headed blackbird.

Note.—For a complete list and description of the members of the Crow Family, see The New Canadian Bird Book, by W. T. MacClement, M.A., D.Sc.

OUR GOOD NEIGHBORS

Grudge not the wheat
Which hunger forces birds to eat;
Your blinded eyes, worst foes to you,
Can't see the good which our birds do.
Did not poor birds with watching rounds
Pick up the insects from your grounds;
Did they not tend your rising grain,
You then might sow to reap in vain.

—*John Clare.*



ROBIN.
Life-size.

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

THE ROBIN

Robin, Sir Robin, gay-vested knight,
Now you have come to us, summer's in sight;
You never dream of the wonders you bring—
Visions that follow the flash of your wing.
How all the beautiful by and by
Around you and after you seems to fly;
Sing on, or eat on, as pleases your mind,
Well have you earned every morsel you find.
"Aye! ha! ha! ha!" whistles Robin. "My dear,
Let us all take our own choice of good cheer."

—*Lucy Larcom.*

Lesson 3

THE ROBIN—ITS COLOR AND SONG

1. INTRODUCTION.

The robin is more endeared to the people of Canada than any other bird. It lives amongst us and is so trustful that it builds its nest right on our window or at least in the nearest shrub or tree. Every boy and girl should study its habits, for to learn its ways, is the first step toward a warm attachment. For nature study work no bird is better adapted for observations. The smallest pupils in the school can find out some simple facts, and many can find the whole secret of its nesting and feeding habits. In spite of its tameness, familiarity and amiability, our knowledge of its songs and habits has many gaps. The observations given below are quite extensive and may be distributed amongst different classes according to their difficulty. It is worth while for pupils to keep a record book in which to note the facts they find about the bird and its habits. At the end of the season let each one incorporate these in an essay.

2. GENERAL APPEARANCE OF THE BIRD.

(a) Observations to be made by pupils.

How many inches long is it from the tip of the beak to the end of the longest tail feather? (Pupils will make some very bad estimations and it is well to put a rule at the distance the bird was seen and compare the length of the bird with the length of the inch marks on the rule.)

Describe the shape and appearance of the beak.

Notice the number of toes and their position.

Are the legs well developed or small?

What is the color of the top and sides of the head?

Find white on three places on the robin.

What is the general color of the back?

What is the color of the ring around the eye?

Notice a spot just above the eye.

What is the ground color of the throat and what are the colors of the stripes on this ground color?

Notice the extent of the red on the breast.

What other birds have similarly colored breasts?

When it flies what color is seen on the tips of the outer tailfeathers?

What is the color of the beak?

In the spring notice a difference in brightness in the colors of different individuals.

In what respects do the duller females differ in color from the brighter males?

How do the autumn birds differ in color from those of the spring?

How do the young after leaving the nest differ in color from their parents?

(b) To the teacher.

It is well that pupils should know the exact length of the robin, so that the length of other birds can be estimated by comparing them with it. It is about ten inches long. The beak is of moderate length, and straight. It is yellow in the spring, but becomes horn-colored towards autumn. In the male the top and back of the

head are black and the whole back is grayish slate. The tail is black with white spots near the tips of the outer feathers, conspicuous during flight. A white spot is situated above the eye and a whitish ring around the eye. The throat is white, striped with black. The breast and sides are rufous, the belly is white. The female is duller particularly on the back, which is lighter, and the top of the head, which is more gray than black. The breast is duller. There is no difficulty in distinguishing the sexes in the spring. The young is dull colored like the female, but has conspicuous black marks on the breast. The bluebird and the towhee have breasts colored like that of the robin.

3. ITS NOTES AND SONGS.

(a) Observations to be made by pupils.

Endeavor to find how many notes the bird has.
Distinguish its song from its call.
At what period of the day does it sing?
Can you hear it before you are up in the morning?
Describe its call to express fear or alarm, as when the young are in danger.
What other emotion does it express by its calls?
At what season of the year does it sing?
In what kind of weather does it sing most ardently?

(b) To the teacher.

It is generally impossible to describe a bird's song in words, and the attempt will not be made here. The song of the robin is quite melodious and has some variation; it can be heard just after dawn and also until late in the evening. In its call notes it has a greater vocabulary than almost any other bird. It seems to express all the emotions from the tenderest yearning and love through interrogation, suspicion to the most frantic rage and fear. The meaning of its different notes are not at all well known and careful and patient observation is required by many observers to make the speech of this attractive bird better understood. Its song is most hilarious just before rain, as if it knew that the wet would drive the worms to the surface.

REMORSE

I killed a robin. The little thing
With scarlet breast and a glossy wing
That comes on the apple tree to sing.

I flung a stone as he twittered there,
I only meant to give him a scare—
But off it went—and hit him square.

A little flutter—a little cry—
Then on the ground I saw him lie,
I didn't think he was going to die.

But as I watched him, I soon could see
He never would sing for you and me
Any more in the apple tree.

Never more in the morning light,
Never more in the sunshine bright,
Trolling his song in gay delight.

And I'll think every summer day,
How never, never can I repay
The little life I took away.

—*Sydney Dayre.*

THE SECRET

We have a secret, just we three,
The robin, and I, and the sweet cherry tree;
The bird told the tree, and the tree told me,
And nobody knows it but just we three.

But of course the robin knows it best,
Because he built it—I shan't tell the rest;
And laid the four little—something in it—
I'm afraid I shall tell it every minute.

But if the tree and the robin don't peep,
I'll try my best the secret to keep;
Though I know when the little birds fly about,
Then the whole secret will be out.

—*Anon.*

Lesson 4

OUR MOST FAMILIAR BIRD'S NEST—THE ROBIN'S

1. NESTING HABITS.

(a) Observations to be made by pupils.

At what date is the robin's nest built?
Find all the different kinds of locations for nests.
What is the greatest height at which you find a nest and also the lowest?
Do they commonly build in the woods?
Do they always build near houses?
Examine an old nest and notice the material of which it is made.
Try to find a bird constructing a nest and observe how the straws are brought.
How does the bird construct the nest?
How is the mud carried?
Do both parents help in the construction?
How many eggs are usually laid?

Describe the eggs as to shape, size and color.
How many days does incubation last?
Which does the incubating?
Describe the appearance of the young in the nest.
How long do the young remain in the nest?
Count how frequently food is carried to the young.
What kind of food is brought to them?
How is the nest kept clean?
Which parent procures the food for the nestlings?
When is the first brood reared each summer?
Is the same nest occupied for the different broods of a summer?

(b) To the teacher.

The robins are usually busy with their nests by May. They usually select a tree in an orchard or near a house, but are not fond of nesting in the woods. Both parents assist in building the nest, carrying all the coarse grass, leaves and rootlets first. When a sufficient supply of this material has been accumulated they visit the nearest mud puddle, get their beaks full of mud and squirt it amongst the straw. This is repeated until the straw is impregnated with mud. Then the bird squats in the straw and rounds it into shape. It is then lined with finer grass. Usually four greenish blue eggs are laid and incubation continues for from eleven to fourteen days. The young in the nest have long beaks which, when wide open—as they usually are—have a yellow color. The parents are most diligent in feeding them. Each eats almost its own weight of food in a day. The parents are thus kept very busy, seeking for worms and larvae in the ground, as these are their chief food supply. In eleven days they are usually ready to leave the nest. This event takes place before the end of June. In July the female is incubating a second brood, while the male fathers the first family, which have a regular roosting place in some low, well wooded thicket. The first nest is never used for the second brood but a new one is constructed. The nests are sometimes very dirty, though the filth from the young is carried away by the parent and deposited on the ground, from its beak.

Lesson 5

IS THE ROBIN A USEFUL BIRD?

1. ITS FOOD.

(a) Observations to be made by pupils.

What kinds of food are available for the robin when it arrives first in the spring?

Observe what it actually eats at this period.

When the ground has thawed, find what it searches the lawns for.

Notice its method of pulling the worms out without breaking them in two.

Watch carefully if it gets any grubs or cut worms from the ground.

During what kind of weather are they most successful in procuring earthworms?

Do they secure all their animal food from the ground?

What change takes place in the character of their food during the summer?

What fruits do they chiefly attack?

Do they prefer tame or wild fruit, where both are available?

Suggest a method by which the fruit farmer might protect his fruit against the robin.

What kind of fruit do the young eat?

Do the parents bring them any fruit?

Give an estimate of the number of feedings each young one receives during a day, and of the total food consumed during this period.

If any robins remain during the winter, try to find what kind of food they consume.

(b) To the teacher.

When the robins first arrive in the spring the ground is still frozen and they are unable to get their favorite food. At this time they live chiefly on the berries still to be found on the shrubs and bushes. Those that remain over during the winter are largely

dependent on the same food. As soon as the frost is out, the worms come to the surface and the robins hold high carnival. Particularly after a good, warm rain when the ground is steaming and the earthworms are driven to the surface, our little friends batten on these delicate morsels. But they do not confine their attention to these, but a long list of fly larvae, cut-worms, slugs, ground-beetles, etc., appear on their menu cards. There is no doubt that at this season they are great friends of the farmers. As spring passes into summer and the farmer's small fruits become mature, his affections for the robin begins to wax weaker, as the latter must plead guilty to developing a marked appetite for raspberries, currants and particularly cherries, but even during these months, when the fruit diet is most strongly developed, over forty per cent. is still insectiverous. The robins prefer the wild fruits to the tame, if the latter are available, and it is the complete destruction of these shrubs and underwood which teemed with berries, that has driven our friend to the farmer's garden. It seems to be the young robins, that have recently left the nest, that are the chief offenders. It must also be remembered that even during July and August these same robins, that are feasting on the small fruits, are pouring an endles stream of injurious cut-worms, grubs and caterpillars into four gaping mouths belonging to four nestlings with insatiable appetites; so the robin in taking a few cherries is simply accepting a small payment for the immense benefit he does to the farmer. I confess it takes a good deal of argument to make the fruit grower see it in that light. A nestling robin will probably eat a good deal more than its parents, and its food is entirely of insects and their larvae, worms and grass.

2. ITS MIGRATION.

(a) Observations to be made by pupils.

Note the first appearance of the robin.
Compare records of first appearance for several years.
Note when they arrive in considerable numbers.
Which appear first, the males or females?
Do they come in flocks?
Do the same robins come back to the same districts each year?

During the summer has each pair of robins a district of their own to search for food?
Do the robins collect in flocks in the autumn?
At what time do they depart?
Where and how do they spend the winter?

(b) To the teacher.

The robins appear in numbers in southern Canada some time in March. A few individuals remain throughout the winter living on berries, and the number that do this appears to depend upon the abundance of these berries. Such birds are liable to be seen almost any time during the winter, and their presence accounts for the early records that appear in the spring. The birds arrive in flocks and the males usually precede the females by a few days. The flocks rapidly break up as each seeks his mate. The birds come back to the same locality from year to year. Mrs. Comstock speaks of one female that nested for eight years in the same garden. Each pair appears to have their own region, which they search for food, and no trespassers are allowed. In the autumn they gather again in flocks and in November move to the South in immense numbers; they spend the winter in Florida and other southern states. Here, while their stray brothers who have remained are shivering in protected swamps, they hold high carnival in the sunshine. They remain in flocks and live chiefly on the wild fruits found on the shrubs and bushes of the district.

3. THE OTHER THRUSHES.

The robin is really a thrush and has many features in common with the other thrushes. Our most common members of the family are the bluebird, Wilson's thrush, hermit thrush and olive-backed thrush. These live largely in the woods (except the bluebird), come frequently to the ground and have beaks similar to the robin. They are all good songsters and all migrate and live in flocks at some seasons of the year.

WOOD THRUSH—(Life Size)

WOOD THRUSH.
Life-size.

COPYRIGHT 1900 BY A. W. MUMFORD CHICAGO

Lesson 6

THE WOODPECKERS— HOW TO DISTINGUISH THEM

A good time to begin the study of this group is about April or May as all of them are to be found at this season. The teacher should inform the pupils that they are to observe closely birds found moving on the trunks of trees, as these are chiefly woodpeckers, particularly if they have some bright red about the head. The following table should be written on the black-board, by which the different species can be distinguished, and when they have decided on the right name let them read the description and examine the colored illustration in this volume.

1. TABLE BY WHICH THE COMMON WOODPECKERS ARE IDENTIFIED.

(a) Longer than the robin.
  (b) Almost as long as the crow, not mottled
    (*Pileated Woodpecker.*)
  (bb) Shorter than the pigeon, banded and mottled
    (*Northern Flicker.*)
(aa) About the length of the robin or slightly smaller.
  (b) The whole neck and throat scarlet
    (*Red-headed Woodpecker.*)
  (bb) The whole neck and throat not entirely scarlet.
    (c) Back black, wings white and black.
      (*Arctic Three-toed Woodpecker.*)
    (cc) Back black and white.
      (d) Throat, crest and belly white.
        (*Hairy Woodpecker.*)
      (dd) Belly yellowish, breast with a black patch.
        (*Yellow-bellied Sap-Sucker.*)
(aaa) About the length of the sparrow.
  (*Downy Woodpecker.*)

NOTE.—The pupils should be asked to make the following observations. These should not all be given at once, nor should any one pupil be expected to get records of them all, but by the combined work of the class many of the details can be filled in during the summer.

2. APPEARANCE OF BIRD.

(a) Observations to be made by pupils.

Describe the color of each woodpecker you see, as follows: top of head, sides of head, back of the neck, the back and upper part of the tail, the throat, the breast and belly, the wings.

If two are seen together see in what respect they differ. Notice particularly what parts are red. Study the shape of the beak, the number of toes, the position of each when hanging to the tree. Also notice the curvature and sharpness of the claws. When climbing a tree, is the end of the tail rounded, straight or concave? If there is a specimen in the museum or a dead one is found by any pupil let these points be studied more carefully.

(b) To the teacher.

The facts regarding the colors of each species can be found in The New Canadian Bird Book.

3. THE CLIMBING HABITS.

(a) Observations to be made by pupils.

What is the position of the tail, and of the toes as it climbs a tree?

Does it usually go straight up, spirally, or irregularly?

Does it ever back down? Does it ever slip?

Does it always have the head up?

Is any noise produced as it moves?

What seems to be its purpose in moving up a tree trunk?

(b) To the teacher.

In moving, the tail is held firmly against the tree as a prop and the outer and inner toes are backward, the two middle ones being forward, the four with their sharp claws seizing the foothold with great force. They usually light near the bottom of a trunk and move gradually up in a somewhat irregular manner. They seldom back down as the stiff spines of the tail, held firmly to the wood, prevent it. They never slip as they move forward with steady foot, and are as much at home with head down as up. As they move gaily in searching for food, they give a joyous grunt with every advance.

27

FLICKER.
(Colaptes auratus).

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

SOMEBODY'S KNOCKING

There's somebody knocking;
Hark! who can it be?
It's not at the door! no, it's in the elm tree.
I hear it again; it goes rat-a-tat-tat!
Now, what in the world is the meaning of that?

I think I can tell you. Ah, Yes! it is he;
It's young Master Woodpecker, gallant and free.
He's dressed very handsomely (rat-a-tat-tat),
Just like a young dandy, so comely and fat.

He's making his visits this morning, you see;
Some friends of his live in that elm tree;
And, as trees have no doorbells (rat-a-tat-tat),
Of course he must knock; what is plainer than that?

Now old Madam Bug hears him rap at her door;
Why doesn't she come? Does she think him a bore—
She stays in her chamber, and keeps very still.
I guess she's afraid that he's bringing a bill!

"I've seen you before, my good master," says she;
"Altho I'm a bug, sir, you can't humbug me.
Rap on, if you please! at your rapping I laugh,
I'm too old a bug to be caught with your chaff."

—*Anon.*

THE REDHEADED WOODPECKER

Ho! little red-capped soldier,
With coat of black and white,
With your merry martial music
All the day you bring delight.
Rat-a-tat! rat-a-tat!
And you rattle your drum in glee,
Rat-a-tat! rat-a-tat!
On the stump of the maple tree.

Ah! grotesque little soldier,
When out in dress parade,
You fill each gay beholder
With mirth, I am afraid.
With your bright cap doffed
And your coat-tail limp
You're awkward as you can be;
Go back and drum your tum-tum-tum
On the trunk of the maple tree.

Ah! little red-capped drummer,
There are prisoners hid from me,
'Way up there, all the summer,
In the hole of the old dead tree.
But I now can hear their bugle calls,
And I hope that soon there'll be
From out the gloomy prison walls,
More drummer boys gay and free,
Rat-a-tat! rat-a-tat!
All drumming the old dead tree.

—Mrs. W. L. Meadows.

Lesson 7

WHAT WOODPECKERS DO ON THE TREE TRUNKS

1. FEEDING HABITS.

(a) Observations to be made by pupils.

What do they search the tree-trunks for?
Which woodpeckers search the trunks most diligently?
Which bore holes in bark?
Do they return to these holes, and for what purpose?
Do any dart at insects on the wing or in the grass?
Which one often lights on the ground?
Watch what he is after, examine the ground where he has been.
Do they ever eat fruit or berries?
Find which stores beech-nuts in autumn.

(b) To the teacher.

Their food consists of larvae and small insects, found in crevices of bark and in holes drilled into wood; these they get out with their protrusible tongue. This tongue can be extended several inches, and is hard at the end. The tip is sharp and has barbs directed backward. The sap-sucker lives largely on sap which trickles into the holes he drills into the bark. He also eats the soft outer wood. His tongue is quite short. The red-head and the hairy woodpecker, besides digging insects out of bark, seize them on the wing like the fly-catchers. All of the woodpeckers in the autumn eat nuts, seeds and berries, to a greater or less extent. The flicker gets much of its food on the ground and is particularly fond of ants. It sticks its long tongue, covered with a glutinous saliva, down into the ant-hill like a regular ant-eater and the ants which attack it are held firmly. The red-head also comes to the ground occasionally. This bird also stores up beech-nuts in crevices and knot-holes for the winter, and if there are large supplies he frequently does not migrate in the autumn.

2. FLYING HABITS.

(a) Observations to be made by pupils.

Do the woodpeckers fly in a straight line?
Are their flights long or short?

Are the wings large or small relatively to the size of the body?
What colors are conspicuous in flight, that are not so, while at rest?
Does it make any noise as it flies?

(b) To the teacher.

The wings of the woodpeckers are relatively small, corresponding to the short flights they make. They usually fly only from a tree to an adjoining one, though they can move far during migrations. The method of flight is very characteristic; it is a sort of series of jumps, making an undulating course like some of the sparrows. They are usually silent while flying, though they often start off on a flight with a chuckle. The red-headed woodpecker during flight shows the ends of the wings black, the parts next to the body white. The large white spot on the base of the tail is a sure mark by which the flicker is identified.

3. SONG OF WOODPECKERS

(a) Observations to be made by pupils.

At what season are they most noisy?
How many songs or calls have they?
At what season do they drum?
Do they drum on the same branch each day?
Do both males and females drum?
How is the drumming noise made?

(b) To the teacher.

The woodpeckers make short calls as they go about searching the trunks for food. All of them have a number of such calls, but none have such a variety of notes as the flicker. They are all noisy during the breeding season, when they drum on logs. Each selects a rotten branch and by a series of rapid pecks brings out the loud resonant drumming tattoo. They go to the same log day after day. Occasionally they will choose the metal eaves-trough of a house. Usually only the male drums, but both sexes of the downy and sap-sucker produce this sound.

Lesson 8

A NEST IN A TREE TRUNK

1. NESTING HABITS.

(a) Observations to be made by pupils.

Where are the woodpeckers' nests found?
What is the shape of the opening?
At what season is the nest built?
Are the trees living or dead?
What kind of trees are used?
At what height in the tree is the opening made?
Do both sexes take part in the excavation?
How long are they in excavating?
Do they bring straw, hair or leaves with which to line it?
What is done with the chips removed from the excavation?
What is the shape of the excavation?
Is it dug straight down the tree?
Is it wider at the top or the bottom?
Are the walls smooth?
What do the eggs rest on?
What is the color of the eggs?
What use is this color?
How many eggs are laid?
How long does it take the eggs to hatch?
Do both parents take part in incubation?
How are the young fed?

Note.—In the autumn have a pupil cut off the piece of the trunk of a tree containing the nest. Have the top cut just above the opening and it is better to make the second cut two feet below this. Then cut out a slab about six inches wide and half through the trunk just above the nest so that the bottom of the latter can be seen through it. This makes an excellent specimen for the museum and the whole structure of the nest can be seen at a glance.

(b) To the teacher.

All the woodpeckers build their nests in trees. A hole is made inside of a rotten trunk usually, but rarely a living tree with a decayed centre is chosen. They select a great variety of trees for the purpose. The hole is as round as if made by an auger, and is just large enough to admit the bird. After passing into the centre, the cavity passes down, and as it does so it widens so as to form a bottle-shaped cavity. The chips are either scratched out or removed by the beak, and in the case of the downy woodpecker are removed to some distance so as not to reveal the nest. The walls of the cavity are very smooth. Both male and female take part in the excavation and in incubation. It takes from 5 to 10 days to complete excavation. From 4 to 7 pure white eggs are laid on a few chips that are left in the bottom. The white color is useful for revealing their position to the parent in such a dark place, otherwise in entering they might easily be broken. One is laid almost every day. If the eggs are removed as rapidly as laid, the bird will continue laying for weeks or months. Incubation last from 12 days in the smaller species to 14 in the larger. While the red-headed woodpecker brings the insect food in its bill to the nestlings, the flicker and the hairy woodpecker regurgitate the food from the crops into the mouths of the young. In from three to four weeks the young are ready to leave the nest. The male often drills a second hole into the same or an adjoining tree so that at night he can remain near his mate. Nesting usually takes place during May.

2. GENERAL HABITS AND ECONOMIC IMPORTANCE.

(a) Observations to be made by pupils.

Which of the woodpeckers remain all winter and which migrate?
When do the migrants arrive?
When do they go south again?
In what kind of habitat are the woodpeckers found?
Of what use are they to man?
Are any harmful and in what way?
How should man act toward them?

(b) To the teacher.

The hairy and downy woodpecker remain all winter, the sap-sucker arrives about the middle of April; the flicker appears about the same time; the red-headed woodpecker is usually a migrant, but if the food supply is favorable, it may remain for the winter. They all inhabit the vicinity of trees but some are found in the trees close to houses, particularly the little hairy woodpecker. All these are very useful in destroying insects and larvae injurious to trees, and should be protected.

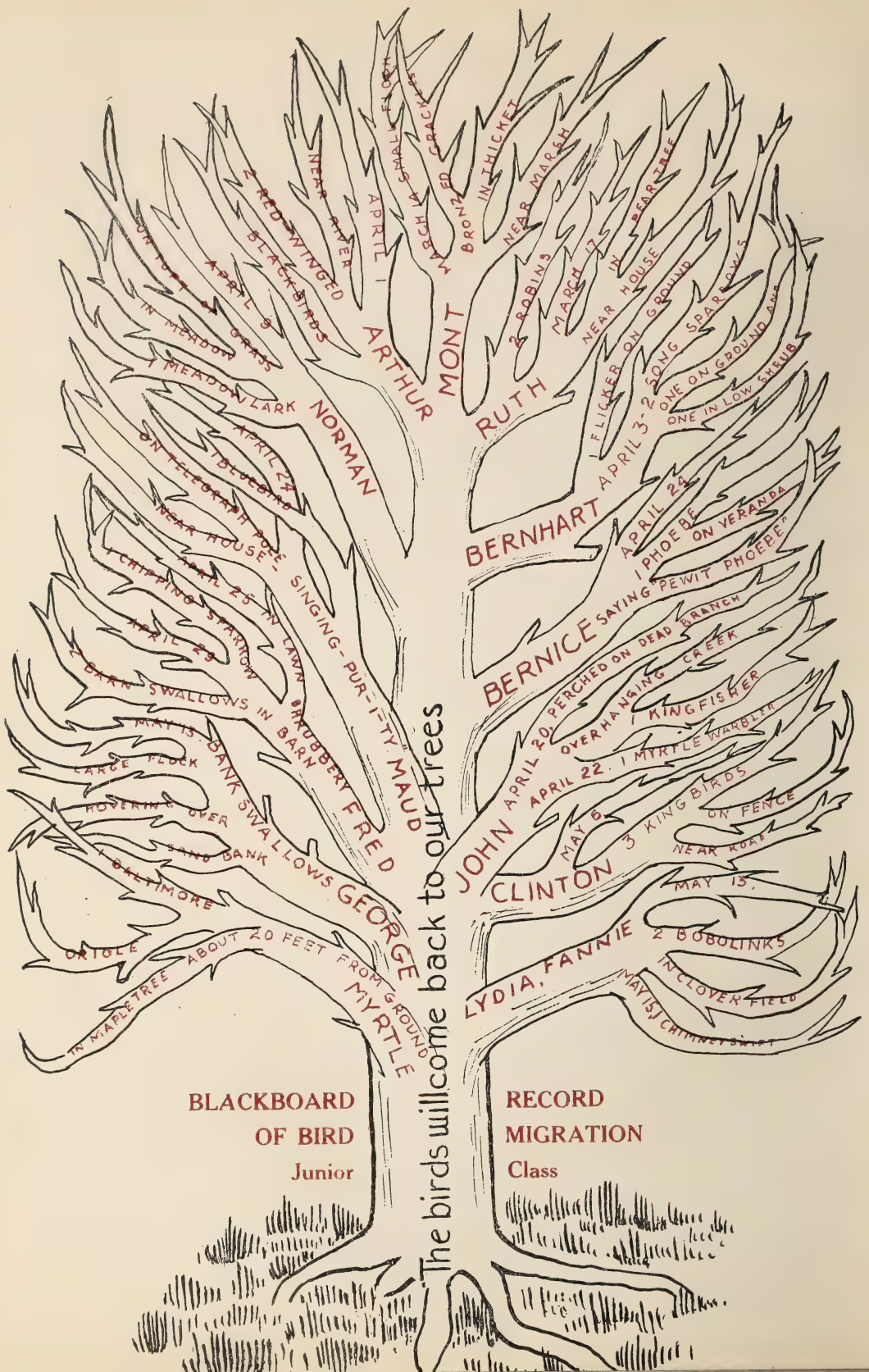
The sap-sucker, however, does much injury to trees by girdling them with holes and causing their death.

It is probable, that without the aid of the woodpeckers in destroying insects, the trees quite requently would succumb to their attacks, hence man, in his own interests, should at all times act as their protector.

PROMINENT MEMBERS OF THE WOODPECKER FAMILY

American three-toed.
Arctic three-toed.
Downy.
Flicker, Yellow-hammer, Higholder.
Hairy.
Lewis'.
Northwestern flicker.
Pileated.
Red-bellied.
Red-headed.
Red-shafted flicker.
White-headed.
Yellow-bellied sap-sucker.

Note.—For full description of the above Woodpeckers, see The New Canadian Bird Book, by W. T. MacClement, M.A., D.Sc.


The birds willcome back to our trees
BLACKBOARD OF BIRD
Junior
RECORD MIGRATION
Class
MONT
MARCH 14 BRONZED GRACKLE IN THICKET
NEAR MARSH
2 ROBINS
MARCH 17
RUTH
NEAR HOUSE
1 FLICKER ON GROUND
2 SONG SPARROWS
ONE ON GROUND
ONE IN LOW SHRUB
ARTHUR
APRIL 1 SWALLOWS
NEAR RIVER
2 RED-WINGED BLACKBIRDS
APRIL 9
ON TOP OF GRASS
IN MEADOW
1 MEADOW LARK
NORMAN
APRIL 22
1 BLUEBIRD
ON TELEGRAPH POLE
NEAR HOUSE
SINGING-PUR-I-TY
BERNHART
APRIL 3-2 SONG SPARROWS
APRIL 24
1 PHOEBE
ON VERANDA
SAYING PEWIT PHOEBE"
BERNICE
APRIL 20 PERCHED ON DEAD BRANCH
OVERHANGING CREEK
1 KINGFISHER
APRIL 22 1 MYRTLE WARBLER
MAY 6
3 KING BIRDS
ON FENCE
NEAR ROAD
MAY 15
2 BOBOLINKS
IN CLOVER FIELD
MAY 15 1 CHIMNEY SWIFT
JOHN
CLINTON
LYDIA, FANNIE
MAUD
APRIL 25 IN LAWN SHRUBBERY
1 CHIPPING SPARROW
APRIL 29
2 BARN SWALLOWS IN BARN
FRED
MAY 13 BANK SWALLOWS
LARGE FLOCK
HOVERING OVER
SAND BANK
GEORGE
1 BALTIMORE
ORIOLE
IN MAPLE TREE ABOUT 20 FEET FROM GROUND
MYRTLE

Lesson 9.

SCHOOL RECORDS OF BIRD MIGRATION

1. INTRODUCTION.

The act of migration is one of the most striking habits of most birds, and every boy and girl has observed the most obvious facts connected with it. They know that the robin and the gold-finch disappear in the autumn and do not return again until the following spring. Many useful and interesting observations can be made by the pupils regarding these phenomena. Records should be kept by the pupils of all classes, of the times of arrival and departure of the different species; and, after the facts have been observed, a discussion of birds should be conducted in the class, so that the main facts and theories regarding this most mysterious habit may be presented to the pupils.

2. RECORDS.

For kindergarten and junior public school classes a blackboard record for the whole school will be sufficient. The teacher asks pupils to watch and report the first appearance of half a dozen of the most common migrants, such as the robin, grackle, crow,

bluebird, song sparrow, etc. The name is placed on the blackboard, and the date and the name of the pupil observing it, will also be recorded. Some little discussion of each bird will be taken at suitable times. The records can be kept merely in columns or they can be done much more elaborately. An excellent plan, but one which involves considerable work for the teacher, is to draw a tree for each of the spring months, and when a bird has been seen by one of the pupils, a colored drawing of it is placed in an appropriate attitude in the tree. A band is placed in its mouth, with the name of the pupil who first saw it, also such other data as are worth recording, such as the date when first observed and the number seen.

In the senior classes in the public schools and in the lower forms of the high schools a different method will be pursued. It is best to begin during the early spring, and each pupil will keep his own record. Each records the different species as he observes them. A number of pages, ruled in columns for the name, date, number seen, exact location, etc., will be kept in the work book, and the records are there tabulated. Once a week the lists are compared, and assistance in identification given. There will be great rivalry to obtain the most complete lists, and some of the best should succeed in indentifying over one hundred birds during the spring term. Besides the individual lists a general record should be kept posted on the bulletin board. In this entries should be made once a week, and it will contain all the species seen by all the pupils. After each bird is placed the name of the pupil who observed it earliest in the season and also the date on which it was first seen. There will be a very friendly competition to see who will have his name entered most frequently on this list. These lists are to be kept from year to year and the dates of the arrival of the different species observed. The pupils will also use the old lists to see what species they should be on the lookout for. The bird lists should be reviewed from time to time, to see which birds have disappeared and which still remain. Thus a complete record of the movements of the species can be obtained.

Lesson 10.

CLASSIFICATION OF MIGRATING BIRDS

1. CLASSES OF MIGRANTS.

(a) Observations to be made by pupils.

Name birds that remain here throughout the summer.

Name some birds that only remain for a few days or weeks.

Name some birds that reside here during the winter.

Name birds that dwell here permanently.

What birds pass overhead northward in the spring and southward in the autumn?

Do any move in the reverse direction?

Are any birds liable to appear erratically at any season of the year?

(b) To the teacher.

Almost all birds spend the winter and summer in different regions, and they always spend the summer further to the north than they do the winter. The distance between the region of summer and winter residence may be only a few hundred miles, or it may be several thousand. The golden plover spends its short summer far beyond the Arctic circle, while the winter is spent well past the equator in South America. The horned lark, which hatches its young in Labrador, will winter with us in southern Canada. Thus we have different birds travelling very different distances during migration, and we have those spending their summer in all latitudes, from the most northern lands down to the equator. Suppose a species spends the summer in Labrador and the winter in Ohio and New York, then it would be called a summer resident in Labrador, a winter resident in Ohio and New York, and a bird of passage in the intermediate regions. Sometimes the summer and winter homes overlap in an intermediate region. For instance, our ruby-throated hummingbird breeds in the summer from Labrador to Florida and spends the winter from Florida to Central America. From Labrador to Florida it would be a summer resident, from Florida to Central America it would be a winter resident, while in Florida it would be a permanent

resident. Though a permanent resident in Florida, the same individuals do not reside there throughout the year. The ones living there in summer would be found much further south during the winter, while the birds that reared their broods in Labrador would probably occupy Florida during the winter. Not all permanent residents are of this character. The common sparrow is not a migrant at all, but the same individuals remain in southern Canada throughout the year. The same thing is true of the ruffed grouse, the bob-white, and probably the chickadee and several others. On the other hand the junco, the robin, and the crow are found in the extreme southern parts of Ontario throughout the season, but it is extremely doubtful if the winter and summer individuals are the same. Our summer residents are very numerous, but are different in different latitudes, some that are birds of passage in the south are summer residents in the north. We have a good number of winter residents, such as the horned lark, snowflake, pine grosbeck, and redpoll, which, on the appearance of the spring, gradually leave us to pass to the north to rear their young. There are also birds that are very erratic in their habits. Most birds settle down for the season in one locality, and even come back to this same region year after year. Others have no settled place of abode, but are vagabonds amongst birds; such are the cedar waxwings, which may appear in eastern Canada in small flocks at almost any season, but particularly during the summer; after remaining for a week or more the whole flock may disappear. The pine grosbeak acts similarly during the winter.

Lesson 11.

THE BIRDS ON THE MARCH

1. METHODS OF MIGRATION.

(a) Observations to be made by pupils.

Do all the birds of one species (say the robin) arrive at about the same time or do they gradually increase in numbers?

Taking some birds in which the males and females can be easily distinguished, observe which sex appears earliest.

Looking up previous migration records in the school, find if the different species appear at the same time each spring.

Does the weather affect the time of appearance?

Do the birds return when food is abundant? Take for example the robin, song-sparrow, and crow.

What duties do the most of them undertake shortly after their return?

Are they congregated in flocks when they appear in the spring?

Do they leave as soon as food becomes scarce?

Do any leave when there is still an abundance of food such as they like?

Which congregate in flocks before they migrate?

Do they all disappear suddenly or do they gradually become less numerous?

(b) To the teacher.

The method of migration varies greatly in different species. Usually a few appear first and they gradually become more numerous until they have arrived in full numbers. All know that only an old robin or so is seen at first and later the numbers increase. Probably the most vigorous and strongest fliers appear first. This may be the explanation why the males usually arrive a few days before their somewhat less vigorous wives. The time of arrival each season varies slightly with most species, but never by many days; it is quite possible that the weather may have something to

do with it. With some of the ducks, it is quite certain that weather is an important factor, as they only migrate north as the ponds and streams, in which they feed, become free of ice. The food supply alone does not appear to determine the date. Frequently some robins arrive while the ground is still covered with snow and there is no more food than throughout the winter. Several warblers appear quite early, before any of the insect larvae are stirring. The crow returns while the ground is still frozen. The same is true of the retreat in the autumn. Many insect-eating warblers go south in August when their favorite food swarms the woods amongst which they roam. The birds frequently arrive in flocks but they rapidly disperse, become mated and begin the arduous task of building a house and preparing for nidification. Many of the birds congregate in flocks in the autumn and may roam about for days or weeks, before finally departing for the south. The large flocks of grackles, blackbirds and robins are familiar to every body. Some leak out gradually and imperceptibly diminish; others are in conspicuous numbers till the last, when some morning all have vanished.

Lesson 12.

THE HOW AND WHY OF BIRD MIGRATION

1. MIGRATION ROUTES.

(a) To the teacher.

This is a subject on which no observation of value can be made by the pupils, and yet it is of such interest and importance, that some of the main facts should be presented to the class by the teacher. When migration begins it usually takes place along the whole width of the territory occupied by the species; as the movement south proceeds, it diminishes in width, and becomes concentrated along good food areas. The movement may be very rapid or it may take place quite leisurely. The routes from the southern States to Mexico, Central and South America are remarkable. It might be thought that most birds would avoid the flight across the Gulf of Mexico by passing round the border into Mexico, but such is not the case. Far more birds fly across this stretch of water than follow its borders; even our smallest birds do not hesitate to take the more direct route. Many of our summer residents only move a few hundred miles south into the United States in the autumn. This is the case with the robin, junco, and some of the sparrows. On the other hand the bob-o-link, the kingbird, the cuckoos and many of the warblers winter in South and Central America. The route back in the spring is frequently different from that of the autumn. The golden plover goes south along the Atlantic Coast to Nova Scotia when in one flight it passes to the West Indies, on the return it follows Mexico and the interior plain to the Arctic regions.

Most birds fly at night; on a moon-light night it is possible to see them passing across the face of the moon. Their calls above can frequently be heard by the practised ear. Great mystery surrounds many points regarding these migrations. How do they find their way for thousands of miles and return to the old nesting place in the same tree? It was suggested that the old ones lead the way and no doubt in some cases that is correct. Frequently the old and young of a species migrate at different times and, under such condition, the young must travel through totally new

territory. We are driven to the desperate dilemma of hiding our ignorance by saying, that instinct, or a sixth sense of direction, leads them. There is no doubt that they usually follow the best food routes, and this keeps them generally along rivers and streams. High mountains form barriers which they seldom surmount.

2. PURPOSES OF MIGRATION.

(a) Observations to be made by pupils.

Do you find any indications that it is the cold weather that drives birds to the south?

Are the birds that remain during the winter better protected against the cold than those that migrate?

Do the spring migrants sometimes arrive while it is still the cold?

Do many birds, that remain during the winter, die from the cold?

What classes of food supply for birds are seriously diminished during the winter?

Do the birds that live on these, disappear when their food becomes scarce?

Do the birds that migrate rear young in the south? (let the pupils find the answer to this from reading some reference book.)

Which is their northern or southern place of residence their real home?

(b) To the teacher.

It is quite certain that birds do not migrate because they are unable to stand the rigors of our climate. Several like the cuckoos, and some warblers go south in August while it is at its warmest in Canada. Some that migrate regularly, occasionally spend the winter in the north with no apparent hardship. This is the case with the red-headed woodpecker and an occasional robin. There is no more complete covering of feathers in the chickadee or the English sparrow, than in the other sparrows or warblers. The feet and eyes are the parts of birds most likely to be injured by frost and these are no better protected in the birds that remain than those that migrate.

The food supply has a much closer relation to this instinct than has temperature. There is no doubt that the summer with its teeming vegetable and animal life can support a more numerous bird population than can the winter with everything dormant. All birds living on flying insects, as the flycatcher, many of the warblers, swallows and vireos must migrate. As most of the plants become covered by snow, the seed eaters also must for the most part migrate or starve. The ducks that get their food from the ponds and streams must go farther south as these freeze over. We can infer that there is a close relation between the food supply and the migratory instinct. Yet even here we meet most contradictory facts. The insect-eaters, that leave us in August, migrate, when their food appears most abundant. Many insectivorous birds return in the spring long before there is much stir in the insect world. Our earliest robins, when they arrive, find material suitable for food just as scarce as during the winter. The outstanding fact regarding migration is that all birds, that go north during the spring, almost at once set about the duties of nidification and this they do at the most northerly point of their range. On the other hand, when they have returned south in the autumn, they never rear their young there. Perhaps, in considering the food supply, we should consider that of the nestlings rather than the adults, and that, while the food conditions may not be favorable for the adults when they first arrive at the nesting place, these conditions will have become more perfect for the nestlings by the time incubation is complete. How the habit arose, and when it began is hidden behind the dim veil of the far distant past. While more complete observations may assist they will probably never entirely reveal all the mysteries of the development of this most interesting instinct.

TO A WATER-FOWL

Whither, midst falling dew,
While glow the heavens with the last steps of day,
Far, through their rosy depths, dost thou pursue
Thy solitary way?

Vainly the fowler's eye
Might mark thy distant flight to do thee wrong,
As darkly painted on the crimson sky,
Thy figure floats along.

Seek'st thou the plashy brink
Of weedy lake, or marsh or river wide,
Or where the rocking billows rise and sink
On the chafed ocean-side?

There is a Power whose care
Teaches thy way along that pathless coast—
The desert and illimitable air—
Lone wandering, but not lost.

All day thy wings have fanned,
At that far height, the cold, thin atmosphere,
Yet stoop not, weary, to the welcome land,
Though the dark night is near.

And soon that toil shall end;
Soon shalt thou find a summer home, and rest,
And scream among thy fellows; reeds shall bend,
Soon, o'er thy sheltered nest.

Thou'rt gone, the abyss of heaven
Hath swallowed up thy form; yet, on my heart
Deeply hath sunk the lesson thou hast given,
And shall not soon depart.

He who, from zone to zone,
Guides through the boundless sky thy certain flight,
In the long way that I must tread alone,
Will lead my steps aright.

WM. CULLEN BRYANT.

RUBY-THROATED HUMMINGBIRD.
About Life-size.

Lesson 13

OUR SMALLEST BIRD—THE RUBY-THROAT

The ruby-throated hummingbird is such a well-known bird that almost every boy and girl knows it at least by name, so that in announcing observations to be made upon it, it is scarcely necessary to give distinguishing marks by which it may be identified. It is the only one of our birds which enters flowers, and it is at this occupation that it is generally observed. It is frequently confused with a moth of about equal size, which visits the flower-garden in the evening, but a careful observation will easily lead to a distinction as there is an utter lack of the sparkling, iridescent colors in the moth, which flash in the sunshine from the throat and back of the bird. The study of this bird should be begun in May.

1. GENERAL APPEARANCE AND COLORATION.

(a) Observations to be made by pupils.

What is the length of the bird? (Remember that a sparrow is six inches long).
Do you know any birds shorter than this one?
What is the length of the beak?
Do you know any other bird in which the beak is proportionally so long?
What is the color of the back?
What is the color of the throat? Is the bird appropriately named?
What is the color of the breast and belly?
What is the color of the wings and tail?
Notice the shape of the tail.
Are the brilliant colors lacking in any of the individuals you observe? How would you account for this?

(b) To the teacher.

The ruby-throated hummingbird is our smallest species, it is less than four inches long being little over half as long as the English sparrow. What it lacks in size it makes up for in unique character of beak, tail, and plumage. The beak is very long and

narrow, almost like a blunt needle; in very few birds is the relative length so great. The tail in the male is markedly forked, but is only slightly so in the female. In the male the whole of the upper parts are bright, shining green, the wings and tail are dull; on the throat is the beautiful metallic ruby-red lustre that appropriately gives it the name. Behind the ruby throat it is whitish. The beautiful colors of the back and throat are absent in the more sombre female.

2. METHOD OF LOCOMOTION.

(a) Observations to be made by pupils.

What kind of motion has it while flying?
What is the position while visiting flowers?
Does it ever light on the flowers?
How is it able to remain in front of the flower?
What is the cause of the humming noise that can be heard?
Does it ever light on fences or twigs of trees?

(b) To the teacher.

The bird is a darter in the method of flight; it dashes from point to point like a flash of lightning. As it extends its long beak into a flower, it holds its body vertical, poising itself by its wings moving so rapidly that they appear like gauzy streaks. It never lights on the flower. Sometimes, as it flies, its wings move so rapidly that their vibration reaches almost the rate to produce a musical sound. This the cause of the humming, that has given it the name. Mose people see it only on the wing, though it spends only a small part of the time flying. The careful observer will see it resting on the fences, and in the branches of the garden trees quite near the nest.

Lesson 14

The Hummingbird's Habits

1. FOOD AND ECONOMIC IMPORTANCE.

(a) Observations to be made by pupils.

What is the purpose of visiting flowers?
Examine carefully the interior of flowers it visits, for small insects.
What flowers does it prefer to visit in the garden?
Does it seem to prefer flowers of any particular color?
At what periods of the day does it visit flowers?
Does it ever run over foliage with its beak?
Does it catch insects in mid-air?
If you ever find a dead bird examine carefully its tongue.
Does it seem frightened of people when entering flowers?

(b) To the teacher.

An erroneous but very general opinion exists regarding the purpose of the ruby-throat in visiting flowers. It was considered that its chief or only food was nectar extracted from the flowers. In reality its chief purpose in visiting flowers is to extract the small insects which are down pilfering the nectar, and in sucking them in it also extracts a certain amount of nectar. The ruby-throat also picks the aphids and other small insects off the under-surface of the foliage and even is capable at times of catching insects in mid-air. It also can be seen sipping the sweet sap from the holes made in trees by the sap-sucker. Its favorite flowers are those that are brilliantly red, such as salvia and the trumpet vine. It also visits the flowers of the honeysuckle, clematis, larkspur, narcissus, roses, phlox, and horse chestnut. The tongue is a remarkable organ. Each side is rolled up and thus it is made into two tubes, the tips of which are frayed. This tongue can be protruded to a great length as in the woodpeckers, and by means of it, it sucks in its food. They are utterly fearless in visiting flowers and it is not an uncommon thing for them to enter flowers held in a person's hand.

From what has been stated it will be seen at once that they do absolutely no harm, but that they are very useful in destroying

many noxious insects. They are also useful in a way not true of any other Canadian bird. They, in their visit from flower to flower, transfer pollen and thus bring about fertilization and a vigorous production of seed.

2. NESTING HABITS.

(a) Observations to be made by pupils.

During the autumn pupils should look in the trees, in gardens visited by hummingbirds, for their nests. tI is quite possible that some would find a nest still building or, at least, occupied by the birds, and the following observations should be made.

Of what substances is the nest composed?

Where is it located and what is its relation to its support?

Why is it difficult to distinguish it from a knot on a branch?

At what date does it build the nest?

Describe the number, color and shape of eggs.

Do both sexes feed the young?

Is the same nest occupied more than a single season?

(b) To the teacher.

The nest of this bird is a marvel of neatness and inconspicuousness. It is composed of plant-down and is covered externally with lichens just like a moss-covered branch. The lichens are bound in place by almost invisible plantfibres and cobwebs. It is not built on a fork usually, but saddled on the upper surface of a horizontal limb. The construction takes place about the middle of June, and requires ten days for its completion. The two little white eggs, elliptical in shape, are frequently deposited before the nest is completed. The young are fed by both parents, and the disgusting process of feeding by regurgitation takes place. The parent thrusts the long beak deep down the throat of the nestling and then vomits the partially digested insects. Two broods are reared during a season. The same nest may be occupied for several years.

3. MIGRATION AND GENERAL HABITS.

(a) Observations to be made by pupils.

At what season do the hummingbirds arrive?
Notice which you see first, male or female.
At what season do they depart?
Do they ever go about in flocks?
Is it found in the woods or open country?
Have you ever seen evidence of its pugnacity?

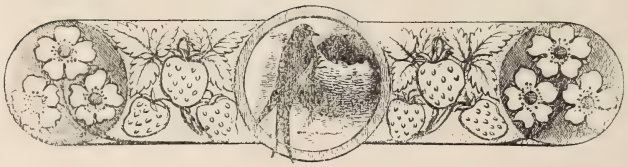
(b) To the teacher.

They arrive about the middle of May when the flowers are well opened; the males appear a few days before the females. They remain until October and then start on their long flight to southern Florida or Central America. They prefer gardens and open places to the woods. No bird is more fearless of man or of other animals. They are most pugnacious, and will drive off birds many times their size. By putting brandy and sugar in the flowers which it visits, it is possible to intoxicate it and it can then be taken by the hand.

The hummingbirds are to be found only in the Western Hemisphere. There are more than 450 species of these minute birds, of which only the following five reach Canada, viz.—

Allen,
Black-chinned,
Calliope,
Ruby-throat,
Rufous.

(For full description of the above see The New Canadian Bird Book.—Dominion Book Co.)



THE SWALLOW

The lilacs are in blossom, the cherry trees are white,—
I hear a sound above me, a twitter of delight;
It is my friend, the swallow, as sure as I'm alive!
"Now pray, how did you get here, and when did you arrive?"

"I flew from the sunny south, two thousand miles and more,
And only this morning reached here, to rest above your door."
"The South! How do you like it?" "I like its sunny skies;
And 'round the orange blossoms I caught the nicest flies,—

But when the Spring had opened, I wanted to come back."
"You are just the same old swallow, your wings are just
as black!
We love to hear your twitter, and see your graceful flight,
Which seem to never tire you, from early morn till night."

—*Anon.*

BARN SWALLOW.
⅞ Life-size.

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

Lesson 15

THE SWALLOWS AND THEIR GRACEFUL FLIGHT

1. INTRODUCTION.

The swallows are easily distinguished at sight from any other birds. Their familiar manner of flight, sailing through the air in graceful circles quartering after insects, will mark them off for the most careless observer. The only bird that is likely to be confused with them is the chimney swift. A table is given below by which the different species may be readily distinguished. The features chosen in the table are so obvious and easily seen, even while the birds are flying, that no difficulty should be experienced in sorting out the swallow. In the spring, this table may be written on the blackboard or copied by the pupils into their field note-books.

Table to Distinguish the Swallows, Including the Chimney Swift.

(a) Beneath with some conspicuous brown or chestnut.
  (b) Whole back, right to the tail, steel blue—*Barn Swallow.*
  (bb) Lower part of back distinctly brown or buff—*Cliff Swallow.*

(aa) No chestnut or brown above or below.
  (b) Pure white below—*Tree Swallow.*
  (bb) White below with a gray band on the chest, dull above —*Bank Swallow.*
  (bbb) Black or dark beneath.
    (c) Shining blue black above—*Purple Martin.*
    (cc) Dull fuscous above—*Chimney Swift.*

2. GENERAL APPEARANCE OF BANK SWALLOW.

(a) Observations to be made by pupils.

What is the color of the upper surface?
What color is the under surface?
Is there a band across the breast?
What shape is the tail—forked, square or rounded?
What is the shape of the wings?
Notice the size of the beak and the width of the gape.
How does the bird compare in size with an English sparrow?

(b) To the teacher.

Although we have chosen the most modestly dressed of all the swallows for the lesson, it makes up, in grace of form and movement, for what it lacks in metallic tinting. The upper parts are brownish gray, the under surface is white, but this whiteness lacks the purity of that of the tree swallow and has a dull band across the breast separating the white of the throat and chest. This bird is deceptive as to its size. It is really a smaller bird than the English sparrow, but its long pointed wings, projecting well beyond the end of the tail, give it an appearance much larger. The tail as in the other swallows is forked but much less so than in some of its relations. The male and female are much alike and the young closely resemble the adults. The beak is very short and weak but the gape of the mouth extends back quite to the eyes. The feet and legs are short and weak.

3. LOCOMOTION AND FOOD.

(a) Observations to be made by pupils.

What are the characteristics of its flight?
When it glides, does it move its wings?
In gliding, can it go from a lower to a higher level?
How long can it glide without moving the wings?
What characteristics of the wing make it suitable for powerful flight?
Can it stay long on the wing?
Is its flight steady or flickering?
Where does it go to rest?
Notice the heights at which it flies in bright and in dull weather.
Can you give a reason for these different heights?
What does the swallow eat?
Notice it skimming over a pool and try to see how it catches the flying insects.
Does it ever touch the water as it skims its surface?
Examine carefully the beak of a mounted specimen (if possible) and see how the beak is adapted to its manner of feeding.
Did you ever see it eat vegetable food?
Of what economic importance are the swallows?

(b) To the teacher.

The flight of the swallows gives them an interest and a unique position in our landscapes. Nobody can resist the pleasure of watching a flock skimming in graceful gyrations over the surface of a still lake, when the air is humid and signs of rain are evident. With its long pointed wings extended, it glides placidly along, now careering forward like an arrow, now in a wide sweep to the right or left, again rising in the air as if defiant of the law of gravity; and all this with scarcely a motion of the wings. The swallow can go through all these motions without the aid of any wind. It remains on the wing for long periods and apparently without the slightest effort or fatigue. When its hunger is satiated or it needs a rest, it usually glides into its tunnel in the vertical side of the sand bank or gravel pit. We could understand a swallow practising these aerial evolutions from the pure sensation of the motions, but while we humans might interpret these graceful glidings aesthetically, the swallow is the strictest of utilitarians. That diminutive beak, almost too short to be seen, and with a weakness proportional to its size, seems too delicate to peck a seed or even to crush an insect. Examine more carefully and you will notice the angles of the mouth project backward well beyond the eyes. When that mouth is opened its forms an aperature so wide, that even the frog would have to distend its jaws to equal it. Such a funnel, gliding through the air, forms a trap that engulfs countless flying insects—mosquitoes, beetles and flying ants—most of them too small to be noticed by the fly-catchers, but none too small to give man and beast considerable annoyance. The number of these insects entrapped by the swallows is simply incalculable. Occasionally in skimming for the insects they may pick them from the water or from blades of grass but usually they catch the insect while in flight. When insects are scarce through prolonged periods of unfavorable weather some of the swallows are driven to eat berries, though their beaks seem quite unsuited to such a purpose.

A Cosmopolitan Bird With a Home in a Sandbank—The Swallow

1. NESTING HABITS.

(a) Observations to be made by pupils.

Where does this bird build its nest?
Do they always nest in colonies?
What are the favorite nesting places?
What is the shape of the opening?
Notice the different sites and find what distance below the surface excavation begins.
Does the boring go in horizontally?
Does it go in straight?
What is the size of the hole?
To what depth do they excavate their holes?
Try to find one beginning an excavation and see how it works.
What is the chief tool it uses in excavation?
Of what is the nest made?
Describe the number and colors of the eggs.

(b) To the teacher.

These swallows only frequent districts where suitable nesting sites can be found. The favorite position is a vertical sand bank bordering a river or stream. With the advent of civilization they have begun to extensively occupy gravel pits. Almost every vertical sand bank in Canada looks as if it had been bombarded by small cannon balls. These holes, which the swallows have occupied for both nesting and a home, have been excavated by themselves. They run in almost horizontally but are slightly elevated towards the inner end of the burrow and are well protected from flooding by water soaking through the sand. These holes pass in, only a few feet below the surface and penetrate usually about two feet but may extend much further depending on the nature of the material. They usually go straight in but, where stones are met, they divert their course to the right or left. The opening is not round,

but horizontally elliptical and the bore is just large enough to admit the bird, but every boy knows that it is too small to admit the hand. It seems marvellous that a bird, with such a weak beak and still weaker legs, can excavate the compacted sand and frequently at a rapid rate, as the burrows are dug out in a few days. In the spring it is not difficult to see them beginning to dig out their home. They cling to the vertical bank with their feet and remove the sand with their beaks. In doing so, they stand in any position with head either up or down. The nest is a very crude affair made of straw and feathers of gulls or ducks, which the bird has picked up on the shore. Four or five white eggs are deposited on this. The young are fed on insects of a larger type than the adult bird usually eats. They raise several broods during the year.

2. MIGRATION AND GENERAL HABITS.

(a) Observations to be made by pupils.

Observe the first appearance of the birds about the sand banks.

Do they come in flocks?

Do they appear to be paired when they arrive?

If opportunity offers, notice their appearance about their homes on a cold day.

At what dates do they disappear?

Find from some reference book where they spend the winter. (See the new Canadian Bird Book.)

Find if these birds are found in Europe and Asia?

Where do the old world species migrate for the winter?

What is the nature of their song?

(b) To the teacher.

The bank swallows arrive in flocks in May and begin hovering about the sand banks. They are already mated. They seldom arrive before spring has well set in, for they are pre-eminently a warm weather bird. The arrival of the swallows is the surest sign of spring. If a cold spell comes on after their arrival, it goes hard with the swallows. They pack themselves into their burrows and remain limp and almost lifeless until the warmth reappears. If it is long delayed many of them die of exposure. In the autumn,

at the end of September, they leave in great flocks for the south and spend the winter under the warm skies of Central America and tropical Brazil and adjoining countries. The bank swallow has the widest range of any land bird.

The banks of Alaska are drilled with its holes, even Labrador is not too inhospitable to harbor it in the summer; the peasants of Ireland know it as the early swallow, and the river banks of China and Siberia form its nesting place. In the winter, the sunny skies of India and Africa as far south as the Transvaal are brightened by its graceful motions. Australia and New Zealand alone are left unvisited. Such a bird, with its remarkable nest and its beautiful motions, needs no song to endear it to us. Its song is not dissonant to the ear, though it cannot be dignified by the name of anything more than a "giggling twitter."

The swallows have representatives throughout the world, living entirely on insects; principally ants, beetles, weevils and flies; hence they are of inestimable value to the agriculturist, as the quantity of these pests consumed in a district can only be estimated in tons.

(For full description of Swallows, see The New Canadian Bird Book.—Dominion Book Co.)

565

NEST OF THE AMERICAN WOODCOCK.
(Philohela minor).

COPYRIGHT 1903, BY A. W. MUMFORD, CHICAGO

Lesson 17

BIRDS' EGGS—THEIR SHAPE, SIZE AND NUMBER

SHAPE, SIZE AND NUMBER OF EGGS.

(a) Observations to be made by pupils.

What different shapes of eggs have you seen?

Notice how the eggs of one of the sandpipers are arranged in the nest.

Is there any difference in the shapes of eggs in a deep hollow nest and those in a shallow hollow?

Is there any relation between the number of eggs laid and the danger to which the eggs or young birds are exposed?

Is there any relation between the number and the size of the egg?

Is there any relation between the size of the egg and the state of development of the newly hatched young?

(b) To the teacher.

Eggs vary greatly in shape. Some are quite spherical, as those of some owls, parrots and woodpeckers—all birds that lay their eggs in cavities where there is no danger of them rolling out. Others lay the ordinary ovate egg. Many are pyriform, very large at one end and tapering off rapidly in a straight line to a small point. This shape is particularly common amongst those birds that lay their eggs on slight depressions in the ground, where they might be blown by the wind or pushed out of the nest by the bird's feet. An egg of such a form rolls around in a very small circle and is very unlikely to be rolled out of a nest. The gulls, terns, sandpipers, plovers and many sea-birds lay such eggs. A good many that lay such eggs have four to a clutch. These are invariably arranged with the small points toward the centre. These

eggs are relatively large, but, by being of this shape and arranged in such an order, can be placed into such a compact space, that the small bird can cover them more completely during brooding. The eggs of some birds are elliptical. The surface may be glossy, as in the woodpeckers, smooth as in the fowl, greasy as in the geese, or rough and chalky as in the grebes. The number of eggs amongst birds, as the young of most animals, bears a definite ratio to the dangers the young encounter. Many sea birds that nest on barren rocks far from all marauders lay only a single egg. The average number is about four; the hummingbird, whose nest is so perfectly protected by its diminutive size, but more so by its complete resemblance to a knot on a branch, only finds it necessary to lay two. The duck, whose nest is exposed on the surface of the ground and whose young, as soon as hatched, leave the nest and rove about amongst all the dangers of the woods and waters, lays more. The bob-white that builds no nest at all, but deposits its eggs in a slight hollow, is exposed in a marked degree to the egg stealers. As the eggs are white they are very conspicuous; the young leave the nest as soon as hatched, and as a result of all these dangers, this bird finds it necessary to lay twelve to fifteen eggs. The size of the egg has a certain relation to the condition of the young when born. A young hummingbird is blind, naked and quite helpless for several weeks. A young duck or chicken when born, is entirely covered with down. When the newly-born bird is able to move about, the egg is generally large, while the helpless young come from comparatively small eggs. If the eggs, as soon as laid, are taken from the nests of some birds, the female will continue to deposit them. By this method, flickers and kingfishers have been made to lay thirty or forty eggs in almost as many days. Birds of the same size, but of different species, often lay eggs of very different sizes. An Australian bird, the kiwi, about the same size as our fowl, lays an egg five inches long. Many other interesting facts about both eggs and nests might be taken in class.

FROM COL. GERARD A. ABBOTT.

NEST OF THE CEDAR WAXWING.
(Ampelis Cedrorum).
About Life-size.

COPYRIGHT 1904, BY A. W. MUMFORD, CHICAGO

Lesson 18

HAVE THE BEAUTIFUL COLORS OF BIRDS' EGGS A MEANING?

1. COLOR OF BIRDS' EGGS.

(a) Observations to be made by pupils.

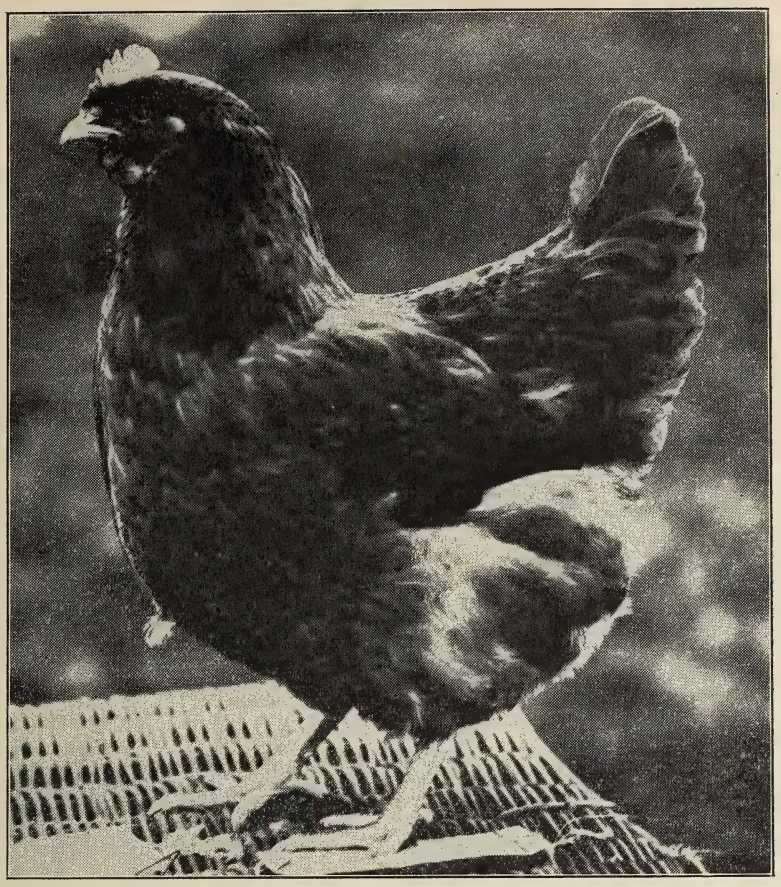
Let each pupil fill out as many as possible of the following observations during a complete spring and summer:

What birds lay pure white eggs?
How many of these eggs were laid in nests hidden in tunnels?
How many were laid in nests hidden in holes in trees?
How many were laid in arched nests?
How many were laid in open nests?
Were those in open nests conspicuous?
Among the white eggs that were conspicuous, in which ones were the parents quite able to defend the eggs against marauders?
How are hummingbirds' white eggs protected?
Were there any white eggs which the sun shone directly upon?
Which of the white eggs have a polish on them?
Are such eggs usually contained in a dark nest?
What purpose would the polish serve to the parents?
Upon what bird's eggs does the sun beat down?
Are they always deeply pigmented?
Which ones laid plainly in sight are difficult to see?
Why are they difficult to see?

(b) To the teacher.

The great variety in color and pattern and surface of birds' eggs is very difficult to interpret and much has still to be accomplished. The eggs of turtles, snakes and lizards are usually white, and we are probably justified in stating that the original color of the earliest birds' eggs was of the same color; but time has brought about the various changes in color in relation to the varied habits of the different birds. A great many birds have retained the orig-

inal color—white. The most of these deposit their eggs in hidden nests where it is quite dark and any color would be a useless ornament, as it could never be seen. To such a class belong the swallows and kingfisher, who burrow in the ground; the woodpeckers who build their nest in the hollow of a tree, and many of the owls which have darkened nests. The white color is here useful, particularly when the surface has a polish, as in the case of the woodpeckers and kingfisher. In the dimness of the hole the eggs can be faintly seen and the parents are prevented from tramping them down, or pushing them out of range. Some exposed eggs are quite white. Now a white egg shining out among the darker colored surroundings would appear to be a signal for egg stealers, and thus be a detriment to the bird. But in almost every case there is some compensating factor that negates the injury. While the duck lays a large number of white eggs in a shallow hollow and often in surroundings that make a contrast, she always draws the inconspicuous down over their surface before leaving the nest. The hummingbirds' eggs are white and in an open nest, but they are very small and the nest is deep. Moreover, the nest itself is such a perfect assimilation with its surroundings that the egg thief has great difficulty in detecting it. While geese and swans lay white eggs they are quite capable of defending them against enemies of all kinds. It has often been noted that white eggs are never laid where they are exposed to the direct rays of the sun. Almost all eggs laid under these conditons are deeply pigmented. Many of the gulls, terns and other water birds lay eggs on bare rocks; the sandpipers lay them amongst the shingle on the shore; the night hawk often lays them amongst the pebbles on a tar roof. Now the sunlight penetrating an egg might be very injurious to the embryo within and a pigmented screen may protect the germ against death. Invariably such eggs laid in the open are so colored as to be almost impossible to detect amongst their surroundings. I have stood amongst the nests of gulls and terns on rocky islands where there were dozens of eggs within a few feet of me and yet it was almost impossible to find any of them.



Lesson 19

THE MYSTERIES OF A HEN'S EGG

1. INTRODUCTION.

The nests of birds are so striking, so varied in form, so remarkable in construction and show such ingenuity on the part of the little builders, and it might be added that they are so accessible, that every teacher of nature study should know something of their mysteries and instil into the pupils a spirit of investigation leading to a knowledge of these remarkable homes made with no tool but a pointed beak. The eggs are not less remarkable and have always attracted youth. They have always been a source of interest to the collector, and that is not to be wondered at. The forms are so perfect, the variety in coloring is so great and the markings are so delicate and so beautiful that their discovery begets a sense of joy. They are just difficult enough to be found, to give interest to the hunt and enthusiasm at the discovery. The teacher

must endeavor to make the pupils more than mere vulgar hunters of curiosities, he must endeavor to lead the pupil to see, that in all this mad prodigality of nature in form and color, there is a sane economy, in that, these structures are related closely to the welfare of the bird itself.

2. STUDY OF A HEN'S EGG.

(a) Observations to be made by pupils.

(Note.—This work can be done in the class. Each pupil should bring a fresh egg and a hard boiled one.)

What is the surface of the shell like?

With a lens examine the surface for little pores or openings. What is the use of these pores?

An egg, if it freezes, often appears as if liquid had been forced out through the shell, though no crack may be present. Try this. Explain it.

Weigh half a dozen eggs accurately. After letting them stand in a fairly warm place for a few days weigh again. What part has the pores played in this change in weight?

Why do some dip eggs in wax or lard or water glass to preserve them?

What are the colors of the different hens' eggs in the class room?

Have pupils investigate which breeds lay the white eggs and which the brown ones.

Put some egg shell in vinegar and put some limestone in it and see if they are acted on in the same manner by the liquid.

Of what substance is the shell made?

Which would fit more compactly in a nest, ovate eggs or oval ones? What is the shape of the egg?

Roll it on a hollowed surface the shape of its nest and decide how its shape would tend to keep it from rolling out of the nest.

How many times as heavy is the hen as the egg?

Break the raw egg into a transparent vessel of water and examine its structure—the white, the yolk, and observe on the top of the yolk the germ spot.

How would the chick in the egg get air to breathe?

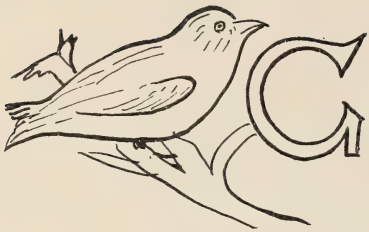
Is the air space of different sizes in the different eggs?

Is there a membrane lining the shell? Is it in contact with the shell at all points? At which end is the air space? How could the age of an egg be told?

How does the experiment, in which the eggs were weighed, help you to interpret the different sizes of the air spaces?

(b) To the teacher.

The surface of the hen's egg is usually smooth and the white ones often have a gentle polish. Painters have one finish, with the slightest touch of polish, called an egg-shell finish. When the shell is placed under the magnifying glass it can be seen at once that the whole surface is perforated with openings as numerous as the sweat pores on the surface of the human hand. Through these the contents of the egg are continually evaporating and it is thus continually diminishing in weight. As the liquid contents go out, the air pushes in and makes the air-space at the large end of the egg increase in size. There is no air-space in a strictly new-laid egg, in contradistinction to a shop new-laid egg in which the air space is frequently well developed. The age of an egg can be determined to a certain extent by the size of this air space, although any factors that hasten evaporation will cause the space to develop more rapidly. The covering of the egg by wax, lard or water glass prevents evaporation by filling the pores. The shell of the egg is largely carbonate of lime and is made of the same material as limestone, marble, chalk or oyster shells. When put in vinegar, or any other acid, the liquid bubbles up violently—carbon dioxide escaping. The color of hens' eggs vary from brown to pure white. The large breeds, such as Rocks, Wyandottes, etc., lay the brown eggs, while the smaller and more active breeds lay pure white ones. The hens' eggs vary considerably in shape, but are almost always ovate. They have one end larger than the other. Such shaped eggs can be arranged more compactly in the nest. If one is put on a flat surface and pushed forward, it does not roll across the surface as would a globular or elliptical body, but rolls around in a small circle; the greater the disproportion in size of the two ends, the smaller the circle. This quality prevents it from being rolled out of the very shallow nest which a hen naturally constructs.



GROSBEAKS

Have you ever heard of the sing-away bird,
That sings where the run-away river
Runs down with its rills from the bald-headed hills
That stand in the sunshine and shiver?
O, sing, sing-away, sing-away!
How the pines and the birches are stirred
By the trill of the sing-away bird!

And beneath the glad sun, every glad-hearted one
Sets the world to the tune of its gladness;
The swift rivers sing it, the wild breezes wing it,
Till earth looses thought of her sadness.
O, sing, sing-away, sing-away!
O, sing, happy soul, to joy's giver—
Sing on, by Time's run-away river!

—*Lucy Larcom.*

Lesson 20.

VISITORS FROM THE NORTH—THE GROSBEAKS

1. INTRODUCTION.

The grosbecks are a very interesting group of birds, all showing bright colors and conspicuous on the landscape, wherever seen. Two of them visit us in the winter, one in summer and the other remains permanently, though he scarcely has the right to be called a Canadian citizen, as he has only recently settled in a small part of southern Ontario. They are all of about the same size and have a short, stout beak, the latter characteristic giving them their name. They are a little smaller than the robin. It is not necessary to give a table by which they might be distinguished, as no difficulty will be experienced.

2. THE PINE GROSBEAK.

(a) Observations to be made by pupils.

The teacher should wait until they appear in the winter and then direct the pupils to make their observations.

Compare it, as to size, with the robin.
What is the general color of the bird?
What color is conspicuous on it?
On what part is this color brightest?
What color is the band on the wing?
Are all in a flock of the same color?
What takes the place of the red in the female?
Are they always found in flocks?
How many are found in a flock?
Do they come to the ground?
Notice in what trees they are to be found.
What kinds of food do they eat?
What seems to be their favorite fare?
Look under the trees of the mountain ash and decide whether they eat the flesh or the pips of the fruit.
Do they produce any sound while in the trees?
What is the nature of their song while on the wing?
Make a record of all the dates on which you observe these birds during the winter.
What actions of these birds indicate they come from uninhabited parts?

From some reference book find where they spend the summer. (See The New Canadian Bird Book, by W. T. MacClement, M.A., D.Sc.)

(b) To the teacher.

The pine grosbeak appears irregularly in flocks throughout southern Canada during the winter. These birds make quite an addition to our winter residents as their bright colors and utter fearlessness make them objects of interest to all. The ground color of the body is slate gray but it is washed with rose-red, and this wash is quite bright on the crown, rump and breast. There is also a conspicuous white band across the wings. This is the male I have been describing. The female has none of the rose-red but this color is replaced by olive yellow. These birds seem to be attracted to southern Canada chiefly by the mountain-ash berries. The flocks of grosbeaks strip the trees completely of these berries. They seem to eat mainly the hard, central pips as the flesh is largely deposited on the snow beneath the trees. They also devour the fruit of the sumach, the seeds of the ash, frozen apples and beech nuts. It makes a peculiar gentle sound while at rest, but, on the wing, it has a loud whistle. As we see it in the winter it is quite fearless, allowing a person to approach within a few feet. This is probably a result of its summer home being uninhabited districts, and of it never having learned the fear of man. The pine grosbeak is a winter visitor which only remains in a district for a few days or weeks until the food supply is exhausted, when it moves forward to other regions. Its summer home extends right across the northern part of Canada and Eurasia.

3. THE EVENING GROSBEAK.

Some mention might be made of this bird. It is a resident of the far west and ordinarily does not migrate beyond Lake Superior. Quite erratically it comes, during the winter, in flocks of considerable size and spreads over the eastern part of Canada and the northern United States. These are now frequently seen during the winter and are considered real curiosities. The grace and beauty of color certainly make them attractive features on the landscape. The crown, tail and wings are black, while the under surface and sides are yellow. There is a white patch on the wings as in the pine grosbeaks.

Lesson 21.

THE ROSE-BREASTED GROSBEAK

1. THE ROSE-BREASTED GROSBEAK.

(a) Observations to be made by pupils.

What are the two prevailing colors of this bird?
Notice the color of the head and upper parts.
What is the exact color, position and shape of the brilliant patch on the breast?
Are there white patches on the wing, as in the pine and evening grosbeaks?
Describe accurately the shape of the beak.
What is the color of the beak?
What is the length of the bird? (The robin is ten inches long.)
Notice the number and position of the toes.
Describe the colors of the female.
Try to hear and become familiar with the song of this bird.
If there are a pair in your neighborhood, after becoming familiar with the song, listen for it at night.
If you can find a nest, listen for the bird's song while it is on the nest.
If the bird can be seen while singing, observe if its wings are in motion.
Observe if it goes to the ground for food?
Does it visit the potato patch?
What does it eat there?
Of what material is the nest constructed?
Where is it located?
At about what height above the ground is it found?
Is there much skill in the structure?
Do both birds assist in brooding?
At what date did they first appear?
When do they leave southern Canada?
Where does it spend the winter? (Consult a good reference book.)*

*Note.—See The New Canadian Bird Book.

(b) To the teacher.

This elegant bird should be familiar to all the pupils of the schools. It is elegant not only in its appearance but also in its action and song. The male has the hind and upper parts glossy black. The breast has a most beautiful rose carmine shield-shaped patch. This shield is bordered by pure white. There are two white patches on each wing. The female is a plain bird with much the appearance of a sparrow. The male, in the autumn, takes on his winter colors which are quite different from those of the summer. His rose breast is largely effaced and the brown stripes of the female appear in his coat. This bird has the regular, very short, stout beak of his class. It is yellow in color. He is about 8 inches in length.

The song of the bird is most charming; with vibrating wings he fills the air with a deliciously sweet, clear, mellow carol. He is so filled with his song that he keeps it up well into the night and even whiles away the monotony of brooding with his sweet rolling warble. The female is almost speechless.

This bird is a favorite with the farmer. Many a patch has been cleared of the Colorado potato beetle by this valuable insect-eater. It also devours flies, wasps and grubs. It is not a skilled architect. The nest, made of coarse stems of weeds, is a crude, unlovely affair. It lodges in the thorn bush or a small tree not far from the ground. The male is a model husband and takes a large part in the brooding, his beautiful rose breast just showing above the circle of the nest. This grosbeak arrives in Canada in May and leaves early in September for the West Indies and Middle America where it spends the winter.

2. ITS COUSIN—THE CARDINAL BIRD.

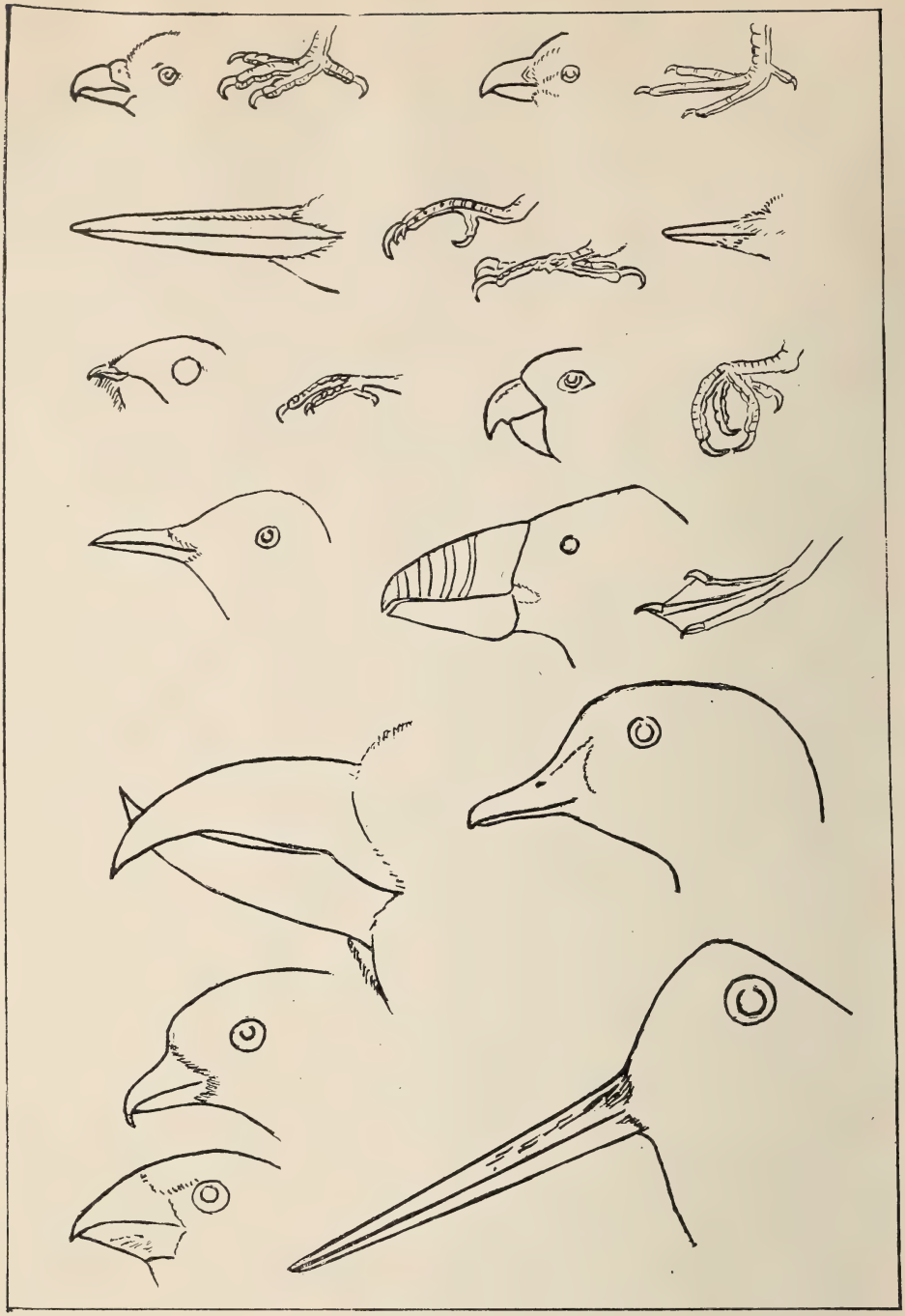
A word might be added about this grosbeak. It has recently settled down in Ontario as a resident. A few have been seen from time to time in the western peninsula; on Pelee Island and Point Pelee they have become very common. They are certainly a valuable acquisition. The whole body is a beautiful bright cardinal; even the beak is red. The female has the red of a more sombre shade than the male. These birds are very attractive and are favorite cage birds.

3. OTHER RELATIVES.

The grosbeaks belong to the finch family, which includes a great number of small birds to be found in Canada. All our sparrows, the goldfinch, the purplefinch and the siskin, that form such a large part of our bird fauna during the summer, are closely related to their sout-billed kinsmen, the grosbeaks. These birds have many features in common, but vary much in habits and in colors; they pass through all shades from the most brilliant red or yellow to the dullest sparrowy brown and ashy. Some of them should be studied according to the plan of the two previous lessons.

THE SPARROW

One syllable, clear and soft
As a raindrop's silvery patter,
Or a tinkling fairy bell heard aloft,
In the midst of the merry chatter
Of robin, and linnet, and wren, and jay,
One syllable oft repeated:
He has but a single word to say,
And of that he will not be cheated."



BEAKS AND CLAWS

From left to right:—1st. row,—bill and foot of Birds of Prey; bill and foot of Scratchers. 2nd. row,—bill of kingfisher; cuckoo's foot; woodpecker's foot and bill. 3rd. row,—whip-poor-will's bill and foot; parrot's bill and foot. 4th. row,—gull's bill; puffin's bill and foot. 5th. row,—crossbill's beak; wood duck's head. 6th. row,—shrike's head; woodcock's head. 7th. row,—grosbeak's bill.

Lesson 22.

THE BIRD'S MOST USEFUL TOOL

1. INTRODUCTION.

The beak of a bird serves so many uses that it is an excellent indication of the character and habits of the bird itself. No organ offers so many variations for study. The interpretation of these modifications in relation to the food of the possessor is a fascinating topic for nature study work. The only certain basis for such work is the actual observation of the beaks of the birds by the pupils and a careful study of the uses to which they are put.

2. THE STRUCTURE AND USE OF THE BEAK.

(a) Observations to be made by pupils.

What is the consistence of the covering of the beak of a bird?

Is any part of it soft?

What kind of material is below this outer covering?

Does the covering of the beak grow like a finger-nail?

What aperture is situated above at the base of the beak?

What are the organs corresponding to a person's arms, used for in the bird?

What organ in the bird performs the functions of the human hand?

Observe all the uses to which a bird puts its beak. (Study the common wild and domestic birds to answer this).

Do the beaks of different birds differ in color?

(b) To the teacher.

Imagine a person with both arms cut off, or developed into wings, and that all the work formerly performed by the hands and arms was to be transferred to the mouth: then one will realize in what a helpless condition such an individual would be placed. Yet such is exactly the condition of the bird. Its front limbs are modified for flying, and are generally useless for any of the purposes for which an animal usually utilizes the anterior extremities. The beak serves not merely the purpose of a mouth for eating food, but is also engaged in seizing, tearing and sometimes grinding it also. If the bird is carnivorous, it is frequently used also to

despatch its victim. But this is only a part of the function of this important organ. Many birds have to defend themselves against fierce and persistent enemies, and the active defence is exercised largely through the beak. When we think of the immense complexity of feathers and how easy they are displaced and ruffled, we marvel at the perfect order in which they are kept by all birds. While a few birds have a comb on the foot, the great majority depend largely on the beak for combing out the plumage, and a very interesting sight it is to see the feather dressing operations of a duck or hen. Many persons oil their hair, but never with half the success of a bird performing this operation on its feathers. It carries its own oil in a little gland in the tail and the oil is extracted from this and distributed uniformly over the feathers, and all by the beak. The nests of birds present the greatest variety both of form, material and position. These are almost entirely formed and the building material gathered by the beak. Whether the material is grass, sticks, cobwebs or mud, they are all carried in the mouth; it may be the nest is excavated in the trunk of a tree, or the side of a bank of earth, and in each case the chief organ of excavation is the beak. The cuckoo lays its eggs on the ground, and carries them in its beak to be deposited in other birds' nests. The surface of a bird's beak is made of horn, but below this is a bony arch. The horn grows like the finger nails but is kept worn down by being well used.

CROSSBILLS

Have a seemingly deformed beak which serves them well in obtaining food from pine cones.

Lesson 23.

THE VARIED FORMS OF BEAKS

I. THE FORM AND USE OF THE BEAK IN DIFFERENT BIRDS.

(a) Observations to be made by pupils.

1. HEN'S BEAK.

Is the hen's beak strong or weak?
What is its shape?
Make a drawing of it.
What are the chief uses this bird makes of its beak?
Is it well adapted to such uses?

2. THE DUCK.

How does the shape of the duck's beak differ from that of the hen?
Examine the inner surface of the beak of the duck.
What is the purpose of the opposed lamellae of the upper and lower mandible?
For what kind of food is it suitable?
Can the duck pick up grains as dexterously as the hen?
Watch a duck feeding in a pond and learn the use of the lamellae.
What other use does a duck make of its beak besides getting food?
Make a drawing of the beak from above and from the side.

3. THE SPARROWS.

Is the beak of the sparrow short or long?
Is it strong or weak?
What kind of food is such a beak suitable for procuring?
The canary is a finch related to the sparrows. Study how it uses its beak on seeds.
Why is it necessary to give it hard substances to pick at?

4. THE CHICKADEE AND BROWN CREEPER.

How do their beaks differ from that of the sparrow?
Are they longer or shorter?
Are they stouter or more slender?

How do they compare in strength?
Are they suitable for breaking hard-shelled seeds?
How are they suitable for procuring food?
For what other purpose are they used?
Make a drawing of the beak from the side.

(b) To the teacher.

1. THE HEN.

It has a stout, strong beak which comes to a coarse point. Such a beak is well adapted for picking up grain and insects and to a certain extent for digging after them; but it uses its feet with coarse claws chiefly for that purpose. The fowl uses its beak in defence, and every small boy who has molested a setting hen knows what an effective blow it can deliver. The hen can also turn its eggs over with its beak.

2. THE DUCK.

Nothing could be more different than the beaks of the hen and the duck. The latter is very broad and blunt pointed, quite unsuited to pick up a grain. It is more like a big trap for engulfing large quantities of material. If it is opened, raised, transverse ridges bounding the whole inner margin both above and below are observed, and when the beak is closed, the lamellae of one mandible fit the spaces in the other. It is really a strainer. The bird takes a mouthful of water and sediment from the bottom of the pool and the liquid part is strained off between the ridges, while the worms, crustaceans, etc., are retained and swallowed. This is its natural way of feeding, although domestication has led it often to various kinds of food. It is strange how nature prepares the same arrangements in widely different animals. The whalebone taken from the mouths of whales is made of ridges arranged in the jaws quite similarly to the lamellae of the duck, and used for quite similar purposes.

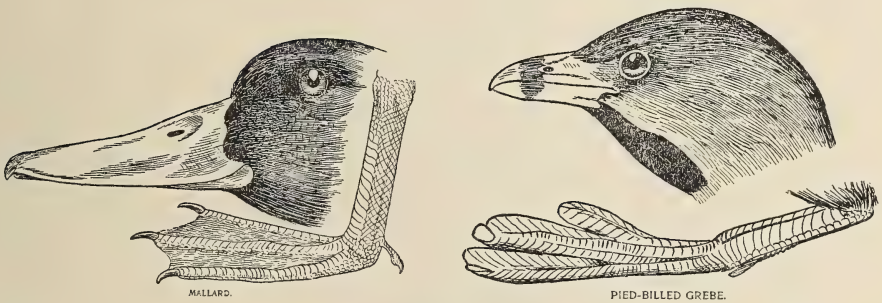
3. THE SPARROWS.

The sparrows and some related birds are called the finches. They are all characterized by having a comparatively short, heavy beak. They are all seed eaters and such beaks are well suited to such a kind of food. It is only necessary to watch a tame canary—

which is a finch—shell the seeds fed to it, to understand the adaptation of such a beak. Some of the seeds eaten have stout husks which require a strength of beak well developed in these birds. The grosbeaks have these beaks still more strongly developed, until their bluntness detracts considerably from the bird's appearance.

4. THE CHICKADEE AND BROWN CREEPER.

This is the first purely insectivorous bird we have considered. To seize an insect does not require great strength in the beak, and insect eaters usually have this organ rather long and thin terminating in a sharp point. These two birds pick the insects off the bark and leaves and also out of cracks and crevices. The long pointed beaks perform this function with neatness and celerity.



Duck and Grebe.

Lesson 24.

MORE BEAKS

(a) Observations to be made by pupils.

1. NIGHT HAWK, CHIMNEY SWIFT AND SWALLOW.

The beaks of these birds can scarcely be studied from the living specimen, as it is almost impossible to get close enough to see the part well, and these birds are almost continually on the wing. To answer some of the questions, a dead or mounted specimen will be necessary.

How does the size of the beaks of these birds compare with those of the sparrow or robin?

How far back does the angle extend?

If you can procure a dead specimen, open the mouth to see the size of the gape.

How do these birds procure their food?

How is the beak suitable for such a method of obtaining food?

Make a drawing of the beak from above and from the side, with the mandibles well separated.

2. THE KINGFISHER.

Estimate the number of times the body is as long as the beak.

How does this compare in length relatively with the length of the beak in other birds?

What is the general shape of the beak?

Is it strong or weak?

Watch the bird along the bank of a stream and see how he procures his food?

Is his beak suited to such a method of procuring food?

Name other birds that get food in a similar manner and compare their beaks with that of the kingfisher.

Make a drawing of the beak from the side.

3. THE SPOTTED SANDPIPER.

This bird is very common along the Atlantic coast and along all inland streams.

Study what places it frequents.

Examine the moist soil where it has been feeding and study the marks made in the soil as to depth and shape.

What kind of food would it find in such places?

What shape is the beak?

Is it weak or strong?

If a dead bird or a mounted specimen can be procured examine the tip of the beak for signs of sense organs.

Make a drawing of the beak from the side.

4. THE HAWK AND OWL.

Describe the shape of the beaks in these birds.

Are they short or long?

What characters give them strength?

What structures make them suitable for tearing flesh or killing victims?

(b) To the teacher.

1. NIGHT HAWK, CHIMNEY SWIFT AND SWALLOW.

The relation of the beak of the bank swallow is considered in discussing that topic. All these birds have exceedingly short, weak beaks. While very short, the angle extends backward so far, that, when the mouth is fully extended, it forms a funnel of relatively great size, and as they sweep through the air it engulfs the flying insects as in a net.

2. THE KINGFISHER.

The beak of this bird is typical of a large class which might be called fishers. It has a long, stout, sharp-pointed bill which it uses to seize its prey alive. The kingfisher sits on a perch above the water, with a keen eye scanning its depth; at the right moment it darts into the water and emerges with a fish between the mandibles; it returns to its perch and after hitting the fish against the perch swallows it whole. This beak is adapted for seizing and

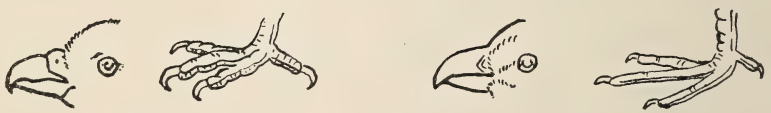
not for tearing its victim to pieces. The tern, the great blue heron and the bitterns have similarly shaped beaks, which they use in a like manner.

3. THE SPOTTED SANDPIPER.

This is the most commonly seen of that class usually called the shore birds, which includes the sandpipers, plovers, killdeer, snipe and woodcock. All have beaks of similar construction. These are very long, thin and weak. They usually do not taper off much from the base to the tip. If a mud flat or a moist shore is examined, where they have been feeding, the holes where they have been prodding are plainly marked. The tips of the beak are somewhat soft and sensitive in some of the species. All feed on small crustacea, larvae, worms, etc., that live in the soft mud near the shore of the river, stream, lake or ocean.

4. THE HAWK AND OWL.

These are birds of prey that seize their victims alive; catching them either in the talons or in the beak. The beak is frequently used for dealing a deadly blow and for rending the victim. Such a weapon requires great strength and a strong grip. The short, stout beak gives the requisite strength while the sharp hook of the upper mandible directed downward can deal a deadly blow and can tear apart the flesh of the victim.



Hawk and Owl. Fowl.

Lesson 25.

THE HORNED LARK

1. METHOD.

The pupils should be asked to begin their observations on the species during the winter. At this season there are few species of birds to be seen and this one is easily found on the country roads and fields with the sparrows. The observations should be given out, a few at a time, and discussed occasionally. Let the observations on the color, structure, feeding-habits be given in January, and then by March those on the nesting-habits and song; those on general habits and economic importance being introduced last, when they have had sufficient opportunity to form an intelligent opinion regarding these matters.

2. COLORS AND STRUCTURES.

(a) Observations to be made by pupils.

What is the general color as seen from the back?
Notice particularly the coloring about the head.
What streaks or patches of black are there?
What is the color of the throat?
What is the color of the tail?
Notice any white on the tail when it flies.
Observing its head, find why it is called the horned lark.
Are there any differences in coloration by which you could distinguish the male and female?
How can these be distinguished from the common sparrows with which they mingle on the road?
Examine their feet through an opera glass as to position and number of toes and as to the length of the claws.

(b) To the teacher.

The facts asked for above as to color are described in the New Canadian Bird Book. As the bird flies the outer tail feathers show white, the black feathers projecting from the back of the head can be erected and look like diminutive horns and from this it gets the name. The following characteristics in color distinguish it from the sparrow; (1) the pinkish tinge on the back; (2) the black patch below the eye; (3) the white in the outer tail feathers during flight and the yellow on the throat. Its foot has three toes in front and one behind, the latter having a very long claw which is almost straight. The female has none of the colors as pronounced as has the male.

3. LOCOMOTION.

(a) Observations to be made by pupils.

Is its course of flight straight or wavy?

Does it ever run?

Does it hop?

Examine the shape of the tracks in the snow left by its feet in running. Make a drawing of them.

When pursued on the road how does it usually act?

Where does it usually light?

When found in the fields in spring how do they protect themselves when followed by a person?

(b) To the teacher.

Unlike some of the sparrows and the woodpeckers, the horned lark flies steadily with no sign of waviness. It is characteristically a ground bird, and it is very seldom indeed that it will ever be seen to light on a fence, a tree, or even on a shrub. It usually endeavors to escape from an intruder by running away rapidly. Its motion on the ground is very quick and it never hops like the robin or sparrow, but always runs. The tracks in the snow where one has been moving are quite interesting and can easily be found after a light snow. The little prints of the toes are in evidence and every foot mark is connected with the preceding by a furrow ploughed out in the snow by the elongated spurs on the hind foot.

When pursued on the road it runs along ahead of the pursuer for a considerable distance, then takes to wing and wheels around back to where it was originally feeding. If molested in the bare fields in the spring, it frequently crouches among the stubble where its brown back assimilates perfectly with the general surroundings, and it will allow an intruder frequently to approach within a few feet before it takes to flight.

4. FEEDING HABITS.

(a) Observations to be made by pupils.

Notice carefully where it is found during the winter.
Is there any kind of food there for it to get?
What does it seem to eat in the fields in winter?
What does it get on the roads?
Study in June if it seizes insects on the wing.
Does it ever eat the grain sown by the farmer?
What injurious insects does it attack in the fields in summer?

(b) To the teacher.

There is not much doubt as to the economic value of this bird. In the fields during the winter when everything is deep below the snow, it finds its food on the seeds attached to the sturdy stems of weeds projecting above the snow, particularly the coarse grasses, the ragweed and smartweed. It also, at this season, resorts much to the road side to pick up any seeds that drop from the farmer's wagon, and particularly to feast on the undigested oat grains from the horse droppings. In the spring it finds abundant seeds on the bare fields, and prefers those of coarse grasses, the birdweeds, the ragweed, and the smartweed, some of the most troublesome of the farmers' enemies, and thus proves itself a friend indeed. The occasional visits during this season to the newly-sown fields for some grain is a very meagre payment for the vast quantity of weed seeds it consumes. In June, and later, it is the farmers' friend once more, as it is now pursuing insects on the wing, and fattening on the grass-hoppers and locusts of the field.

THE HORNED LARK

(Copy the drawing, and color it.)

HORNED LARK.
⅔ Life-size.

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

Lesson 26.

THE NEST AND SONG OF THE HORNED LARK

1. ITS SONG.

(a) Observations to be made by pupils.

Does it make any calls while feeding on the road or in the fields?

As it takes to flight does it make a call?

Watch it during the feeding season in March and April and hear the male sing on the ground.

Does he ever rise in the air like the English lark?

Read Shelley's Skylark and see if it describes the habits of this bird.

(b) To the teacher.

The horned lark while he feeds is perfectly silent, but as soon as he takes to flight makes a faint call, and this will always distinguish him from the sparrows on the road beside him. The male also has a song, which he warbles during his mating season. This song is not quite mellow but is an indescribable warble. He usually perches on a clod in the field or on an elevated knoll when he sings. He also has the same habit as the European lark. He rises straight up until almost out of sight, when he circles around singing a song which is sweet and varied, but lacks the power of his European cousin. This method of singing in the air is to be observed more frequently on the prairies, his original home, than in Ontario and the eastern provinces.

2. NESTING HABITS.

(a) Observations to be made by pupils.

The observations must be begun in spring as soon as the snow is off the ground.

Where does it build its nest?

If you can find several nests notice what direction the land slopes.

Why is the nest difficult to find?

How does the bird act when a person comes near the nest?

Of what substances are the nests composed?

How many eggs are laid?

Can you get any evidence that they rear two broods in a season?

(b) To the teacher.

The horned lark begins building its nest early in March, while there are still patches of snow on the ground. It always selects bare, open fields, and either scratches a depression in the ground or chooses a sunken cow track, in which it builds its nest of grass, nicely rounded and lined with softer material, either the hairy coating of mullein leaves, thistle down, or, if near the railroad, it may choose cotton waste; occasionally there may be feathers in the lining. It is built usually on a knoll and on the eastern side of this. It thus gets the bright sun in the morning when it is coldest and is protected from the cold north-west winds. The top of the nest is level with the surface of the ground and the opening is contracted so that it is most difficult to find. Three to five eggs are laid, most usually four. The ground color is drab gray, profusely spotted and sprinkled with brown. Incubation lasts about fourteen days. They usually hatch a second brood; the male watches the first brood as they roam about, while the female incubates the second clutch of eggs.

3. MIGRATION AND OTHER HABITS.

(a) Observations to be made by pupils.

In autumn watch for the first appearance of the birds.

Keep a close record of observations throughout the winter.

Observe if the autumn and winter birds are the same size as those seen from April to October.
Which have the brighter colors?
Is there any yellow on the throat of the summer bird?
Are they always in flocks?
What are the favorite haunts of these birds?

(b) To the teacher.

There are really two varieties of the horned lark that visit southern Canada. The autumn and winter bird is the typical horned lark. It migrates to southern Canada as early as October, and returns to the far north in March and April. There it nests. Our summer resident is the prairie horned lark. It is slightly smaller than the other and the whole coloring is duller, the yellow on the throat being replaced by white. It, alone, breeds in southern Canada. It arrives north in flocks early in March, the males preceding the females. By the end of March they are mated and nesting soon begins. This is the only period at which they are not found together in considerable numbers. These segregated birds frequent the dry, barren fields in preference to those that are cultivated. This bird was originally confined to the west, particularly the prairies, but it has gradually changed its habits and spread to the east, until it now quite commonly nests throughout Ontario and Quebec. It is a bird of passage in Nova Scotia.

THE CHICKADEE

"Were it not for me,"
Said the Chickadee,
"Not a single flower on earth would be;
For under the ground they silently sleep,
And never venture an upward peep,
Till they hear from me,
Chick-a-dee-dee!

"I tell Jack Frost when 'tis time to go
And carry away the ice and snow;
And then I hint to the jolly old sun,
'A little spring work, sir, should be done.'
And he smiles around
On the frozen ground,
And I keep up my cheery, cheery sound,
Till echo declares in glee, in glee;
' 'Tis he! 'tis he!
The Chickadee-dee!'

"And I awakened the birds of Spring—
'Ho, ho! 'tis time to be on the wing.'
They trill and twitter and soar aloft,
And I send the winds to whisper soft,
Down by the little flower beds,
Saying, 'Come, show your pretty heads!
The Spring is coming, you see, you see!
For so sings he,
The Chickadee-dee'!"

—Sidney Dayre.

Lesson 27.

THE CHICKADEE—ITS SONG AND FLIGHT

1. INTRODUCTION.

If the school is situated near a grove or wood, the teacher, in the winter should rub some fat on a tree-trunk near the school or hang a bone or lump of fat meat from the tree. The chickadees will visit it regularly and excellent opportunities will be offered for observation of its form, colors and habits. The winter is the most convenient time to begin the study, as the birds are numerous both in the town and country and they are easy to observe in the leafless branches.

2. COLORS AND FORM.

(a) Observations to be made by pupils.

What is the size of the bird?
What are the most conspicuous colors?
What parts are shining black?
What is the color of the side of the head?
What is the color of the breast?
What is the color of the back?
What parts are buff?
Is there any white on the wing?
What is the shape and color of the beak?
How many toes are there and what is their position when the bird is on a branch?
Are there any differences in color in different individuals?
Are the male and female of different colors?

(b) To the teacher.

The little chickadee is much smaller than the sparrow and its contrasting colors make it quite conspicuous in the bare branches during the winter. The general appearance of the back is ashy, the top of the head and throat are shiny black with a white line on each side separating the black above and below. The breast behind the black throat is white, while further down, the belly and sides are a cream buff. The wings are gray but have conspicuous white tips to some of the shorter feathers. The beak is black, short, conical and sharp. The feet have three toes in front and one behind.

3. SONG.

(a) Observations to be made by pupils.

What is the chief note of the chickadee?
Does he sing this song at all seasons of the year?
Has he any other call note?
By imitating his call can you bring him to you?

(b) To the teacher.

The chickadee's song is so characteristic that it is scarcely necessary to say anything in the nature of a description. As he goes about from tree to tree in all kinds of weather, the chick-a-dee-dee-dee-dee can be heard every few minutes. The only season he ceases is during the time that the young are being reared. He also has a high noted whistle which is used as a call note.

4. MEANS OF LOCOMOTION.

(a) Observations to be made by pupils.

Notice whether the flight is regular or undulating.
Does he fly long distances?
Where does he usually light?
How does he support himself?
What different positions does he take on the branch?
See how close you can get to the bird.
Does he remain long at one position?
How many do you usually find together?

(b) To the teacher.

The flying is weak and undulating, the extent of a single flight is usually not great, as they move from tree to tree. When lighting on a branch these birds are liable to do so in almost any position, they seem perfectly at ease with head up or down and on the lower as much as the upper side of a horizontal branch. The toes, with thin sharp claws gripping the rough bark, seem to be the main means of support, the tail not playing the part it does in the woodpeckers. As they fly from point to point seeking food, they allow an observer to come very close, and their curiosity will bring them frequently within a few feet of a person. One naturalist remarks that twice one has lit on his hand; another records one as actually lighting on the barrel of his gun as he had it over his shoulder. They are always found in small flocks of about seven or eight. They never light on the ground.

CHICKADEE.
About Life-size.

COPYRIGHT 1900, BY A. W. MUMFORD, CHICAGO

Lesson 28.

THE CHICKADEE A FRIEND OF MAN

1. FOOD AND ECONOMIC IMPORTANCE.

(a) Observations to be made by pupils.

Notice the shape of the beak and decide what kind of food it is suitable for catching.

Observe their purpose in exploring a branch.

Take a branch or piece of bark from an apple tree and examine it carefully with a lens for insect eggs and larvae.

From your inspection of the bark what would you infer regarding the keenness of sight of the bird?

Which are more numerous in a district, chickadees or flickers?

How many chickadees would you judge there are in a square mile of territory in your vicinity?

If each ate one hundred insect eggs a day during the year, how many would be destroyed each year in that area?

What would you infer as to the economic value of the chickadees?

(b) To the teacher.

They are very largely insect eaters. Their sharp-pointed beaks are well suited for picking the small eggs off the leaf and exploring the crevices in the bark for eggs and larvae. They work chiefly over leaves and the small outer twigs, and from many examinations of stomachs their food is pretty well known for all seasons of the year. During the winter it is largely eggs, larvae, and spiders. The eggs and larvae of some of the very worst pests we have are eaten in large quantities.

Amongst those found in large numbers in the stomach are the plant lice, cankerworm, coddling moth and the tent-caterpillar. Though chickadees are much smaller than flickers and both are insectivorous, it is a question if the former are not more useful. They are more numerous than the larger bird; and stay with us during the winter cleaning off the bark when almost all our other birds have left us. If we reckon seven birds to a square mile and

each one to eat one hundred larvae or eggs per day, it is easy to calculate the immense number of insects destroyed in a year by these little helpers. During the summer they consume large numbers of weevils. They also eat buds and some small fruits.

2. BREEDING HABITS.

(a) Observations to be made by pupils.

Where is the nest to be found?
At what season is it built?
Of what materials is it constructed?
How is the excavation for the nest made?
How high is the nest above the ground?
When the nest is in a tree, what kind does the bird prefer?
During the breeding season are they so frequently seen?
Are they as noisy then as at other seasons?
Describe the eggs as to number and appearance.

(b) To the teacher.

The chickadee is found nesting usually in May or June but nests are sometimes found much later. They always construct it in a hollow in a stump, fence-post or tree. They select a natural cavity, an old woodpecker's nest, or sometimes make their own excavation. This they do in a well decayed trunk and very frequently select a white birch for the purpose. The lining of the nest is composed of moss, grass, feathers, plant down, wool, fur, or sometimes entirely of short hairs. Five to eight little eggs are deposited. These have ground of white and are spotted and speckled with brown, particularly at the large end. The parents and the young go in a flock together for almost a year.

3. MIGRATION AND GENERAL HABITS.

(a) Observations to be made by pupils.

At what season are the birds most common?
When are they seldom seen?
Do they inhabit the same districts at all seasons?
At what season are they most common about houses?

(b) To the teacher.

The chickadee is a resident bird throughout its range. That means that it does not go to the south for the winter but succeeds in finding its food throughout this season. In fact, it is more common with us during the winter than the summer. In the latter season it retreats more into the woods for breeding, while during the other seasons it seems more to skirt the woods, and in winter particularly, it frequents the trees close to dwellings. If fat meat or a bone is hung out it will visit this regularly. Some observers, by patience and kindness, have succeeded in getting them to feed from the hand or even to regularly enter the house.

4. THE RELATED CLIMBERS.

Two birds closely related to the chickadee are the white-breasted and red-breasted nuthatches. These are delightful little birds, quite similar in their climbing habits to the one just studied. They are still more dexterous in poising themselves in any position on a limb and assume acrobatic positions that no other bird would dare to imitate. They also incubate their eggs in a hole in a tree.

THE BIRDS MUST KNOW

The birds must know. Who wisely sings
Will sing as they.
The common air has generous wings;
Songs make their way.
What bird is that? The song is good
And eager eyes
Go peering through the dusky wood
In glad surprise;
The birds must know.

—Helen Hunt Jackson.

INROADS THROUGH OUR FORESTS.

The forests and birds are dependent each upon the other. Without the forests, the birds would soon become extinct; they require the trees as a shelter for their homes—a protection against their enemies. Without the birds, the trees would soon become leafless, and die; they require the birds to rid them of their insect enemies. Without trees and birds, this beautiful country would be cheerless indeed, and would soon become uninhabitable; we need the birds and trees to adorn the land and preserve its productiveness. Our bounden duty is to conserve the forests and to protect and encourage the birds.

WINTER

When the blizzard from the north-land
Holds the world in fierce embrace,
And ten million swirling crystals
Sting you, bind you, smite your face,
And your world is not your world.
Grotesque, unknown each bush and tree,
Above the raging, howling tempest
Comes a joyous chickadee, chickadee.

In the soul there's something hidden,
That such a message comes to greet,
Above the rage of human passion
Comes a whisper strangely sweet,
A little song from out the tempest,
Born of hope for you and me,
To the heart love seems speaking,
When this bird sings chickadee, chickadee.

—Anon.

Lesson 29.

WHAT FOOD DO BIRDS FIND IN THE TREES IN WINTER?

(a) Observations to be made by pupils.

Make a list of all the trees and shrubs that retain fruit after the leaves have fallen.

What trees and shrubs have conspicuously colored fruits on them in the winter?

Gather the fruits of sumach, mountain-ash, barberry, snowberry, wild rose, dog-wood or haws and find if there is any food in them for birds.

Notice what birds eat these fruits in the winter.

Break a small branch off an apple tree and examine its surface carefully with a lens for insect eggs.

What birds are constantly eating these eggs from the trunks of trees?

Search the trunks and branches of trees for cocoons and pupa of insects.

Examine the cones of pines, spruce, white cedar and hemlock and see if they retain the seeds (1) in November, (2) in March.

What birds can you find picking at these cones?

Examine the fruiting cones of the birch for seeds.

Examine the buds of some common trees as poplar, apple, maple and decide whether they would furnish food when other supplies run short.

What birds can you find eating buds?

What birds roost in the trees near the houses during the winter?

Can you suggest an enemy of these roosting birds?

(b) To the teacher.

The trees are the favorite haunts of birds at all seasons of the year. The bare, leafless branches of winter one would not expect to offer a very inviting repast to our winter residents, but we only see with the dull eye of man, while the keen observations of the birds can detect many meals in all parts of the tree. When the trunk and branches are examined critically, many eggs and pupa are found glued to its surface, and embedded deep within it are the grubs of borers, which the little downy woodpecker's long barbed tongue soon pulls out to the great benefit of the tree and himself. The chickadee, the nuthatches and the woodpeckers are the chief investigators of the trunk and branches for this insect food. One must have been struck with the many shrubs and trees with conspicuously colored fleshy fruits which remain attached late in the autumn and winter. These, by their brilliant contrasts, attract the birds, who in eating them benefit not only themselves but act as distributors of the seeds. The pure white snowberries on the dark vines, the bright, red mountain-ash on the sombre branches, and the highly colored rose hips are all well known. These are fairly common and willingly eaten by birds in winter. The few robins that remain during this season, and the early arrivals in

the spring, subsist almost entirely on these berries. The pine grosbeaks that come down upon us in the winter denude the whole vicinity of the mountain-ash berries. Many of our winter birds disdain not to partake of the frozen apples still clinging to the trees. Chickadees and woodpeckers take them with zest. The stiff cones of the white pine still have seeds in them in the early winter, but these are so deeply embedded that special beaks are necessary to pry out the nutritious morsels. The crossbills can perform the operation with their crossed mandibles and the pine siskin, unlike his brother finches, has a long pointed beak, which enables him to reach the prize. The grosbeaks, with their massive jaws, can shatter the cone with ease. The seeds of the white pine are all gone in early winter. The seeds of the hemlock and cedar are more easily procured from the cones and last well into February or later, while the cones of the spruces are much more refractory and only the strong and long beaks can procure these seeds. If a bud is examined, it will be found that, hid away under the dry unpalatable outer scales, is a soft, juicy protoplasmic mass, and it is not surprising that during the straits of the winter some birds turn to eating these buds. The ruffed grouse (so-called partridge of Ontario) eats almost nothing else during the winter, as some farmers with apple orchards learn to their grief. The pine grosbeak of the east, and the evening grosbeak of the west will consume the buds as they begin to swell; the rose-breasted grosbeak, the purple finch and our chief offender, the English sparrow, all partake of the buds of the oak, the elm and the maple, much to the detriment of these trees.

The owl plies his nocturnal trade not only in the fields but in the trees. Consternation reigns amongst the sparrows, nestled together in the evergreen trees or among the vines, when the screech owl or the sawwhet swoops noiselessly amongst them some fine winter night. They have learned the sparrow to be a tasty tid-bit to break the monotony of mouse diet.

Lesson 30.

BIRD FOOD IN THE WINTER FIELDS

1. INTRODUCTION.

An excellent topic for nature study during the winter is a discussion of the different sources of food for our winter birds. This can only be successfully pursued after considerable observation on the part of the pupils. These observations should be directed toward making the pupils familiar with the winter birds, their habits and food, as well as toward making a thorough inventory of all the available bird food in the district.

2. FOOD TO BE FOUND IN FIELDS.

(a) Observations to be made by pupils.

What birds are commonly found in the fields in winter?
Do they scratch up the snow looking for food?
What food might be found under the snow?
Bring home some weeds that project above the snow and examine them carefully for seeds.
Do you find any birds picking at these weeds?
Try to find the names of the commonest weeds.
After a fresh fall of snow look for mouse tracks over its surface.
Do these mice run during the day or night?
Do you know any night-flying birds that might destroy them?
Look up some reference books on owls, to find their principal food. (See the New Canadian Bird Book.)
Do the owls remain in Canada during the winter?
Why do we so seldom see them?

(b) To the teacher.

When the fields are covered with snow and everything appears frozen and still, nobody would suspect that any living creature would find sustenance there. Yet a casual winter walk will reveal the presence of birds regularly in these apparently barren wastes. A little closer observation will show some dead weeds projecting their withered branches through the snow. The ragweed, the burdock, the golden-rod, aster, and many other tough-stemmed, tall plants are able, throughout the winter, to push their leafless branches above the snow. These are most commonly seen along fences. If you will have the pupils bring some of these branches to the school, you will find many of them contain numerous small seeds, and these form very nutritious food for the birds that can be seen in their branches throughout the winter. The trim little redpoll with his gaudy breast and head; that emblem of winter,—the snowbird; the long-spurred little visitor from Labrador, the horned lark—all can be seen picking these seeds from the projecting branches. All these are doing good service to man, as the amount of seeds left to fall on the ground and overrun the fields with weeds, is greatly diminished. The drifting snow is sure to lay bare the fields in places and thus the seeds of wheat, oats and clover left by the harvester, are eagerly searched by these sharp-eyed visitors. Here also the withered stems of many of the shorter weeds lay bare their seeds as well.

This does not exhaust the supply of bird food which the fields supply. The mice have their homes under the snow and often move from place to place in tunnels cut through its substance; but a visit to a field after a light snow fall will reveal their tracks, indicating that they come out on its surface as well. As a better protection their surface wanderings are performed chiefly at night; but their nocturnal caution often brings destruction. The keen-eyed owls hover over the fields throughout the nights of winter and every mouse that shows itself is relentlessly pounced upon with an unerring aim. As a result the owls thrive and the destructive mice are kept in check.

Lesson 31.

FOOD IN THE ICY WATERS

1. FOOD TO BE FOUND IN THE WATER.

(a) Observations to be made by pupils.

What birds are to be observed swimming in the open water in winter?

What actions would indicate that they get their food from the water?

What food would they probably get in the water of lakes and seas during the winter?

What birds continually hover over the open water of lakes and seas during the winter?

What food do they take?

Inquire what owl is to be seen on the ice near the open water.

What food does it eat?

(b) To the teacher.

In Canada the open waters and marshes, that swarm with bird life in summer, are firmly frozen in winter and present no opportunities for getting food. But, even in winter, parts of the larger bodies remain open, and, when currents are swift, open waters always abound. The grebes are to be found in this open water throughout the winter diving for fish and mollusks that are to be found in the icy depths. Hovering over the open places near towns and cities, and on the open sea, are the gulls and terns acting the useful part of scavengers. They pick up anything that is carried to the water by the sewers, and keep the former clear of dead fish or other sources of pollution. That ghost of the north, the snowy owl, almost a mass of pure white, appears near these open waters in midwinter and crouching by the airholes seizes in his sharp talons every fish that appears. He does not scruple to seize any grebes or ducks that may occupy that open water.

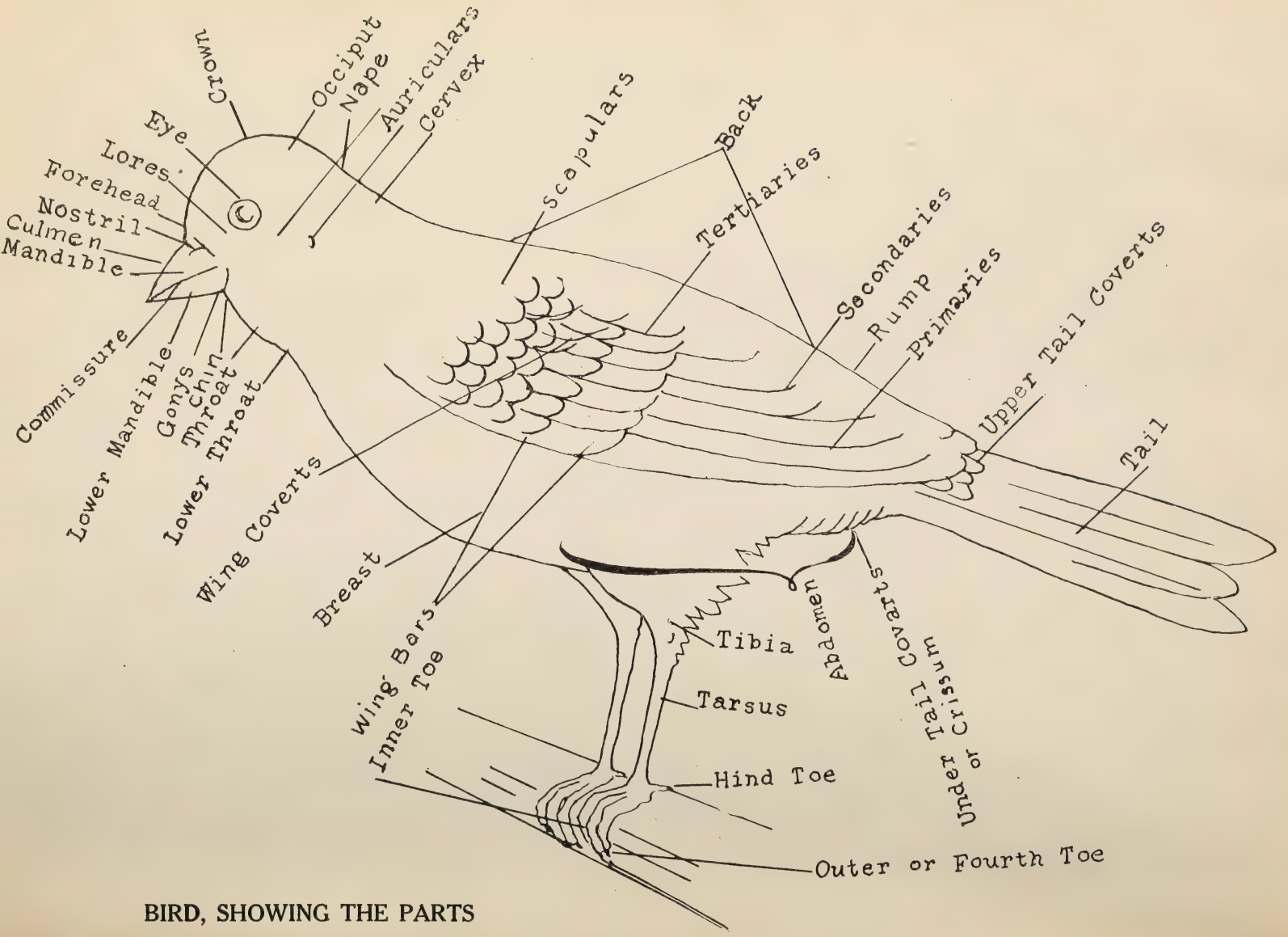
2. FOOD FROM OTHER SOURCES.

(a) Observations to be made by pupils.

Why do sparrows congregate about houses in winter?
Where else are they found at this season?
What birds are to be found on the country roads?
What do they find to eat there?
What food is to be found along the railway tracks?

(b) To the teacher.

In winter, birds congregate about the towns and cities, and about the farm houses and barns in the country. The refuse from the houses,—crumbs, bones, scraps, pieces of vegetables, etc., form a good part of the food of the flock of sparrows found around every house. About the farm yard they consume the seed from the hay and straw, also any grain that is accessible and they frequently enter the granary. They share the daily meals with the barnyard fowls. The sparrows, horned larks and snowbirds frequent the roads where any grain or weed seeds from the farmers' wagons are consumed, but the chief food supply is the undigested oats from the horse droppings. Along the railroads, the same birds are to be seen, as the tracks are kept clear of snow and much grain, seeds and other food are dropped by the passing trains.



BIRD, SHOWING THE PARTS

THE DUCK-SHOOTER'S RUBAIYAT

If this be Spring, indeed, does not appear
From any venture by the local seer—
But be what may be, it is still a fact,
And one worth knowing, that the ducks are here.

Adieu to Winter! It returns to pluck
The foolish flower and garden truck—
But that is one thing, sirrahs: it is quite
Another matter to deceive a duck.

The early emigrating sprig, no doubt,
Knows very clearly what he is about—
And one misdoubting him has but to try
To get him if he would but find it out.

He is about as foolish as a fox,
As any honest man who ever locks
Horns with that knowing wizard of the air
Will testify—look out for hollyhocks!

Look out for daisies and the birds that sing
Their vernal rhapsodies the while they swing—
This is no Weather Bureau tip, my friends;
It is the pin-tail that proclaims it Spring.

Farewell to Winter with its cheerless snows,
The desolation and the wind that blows,
Nor ever wearies of its mournful dirge—
The pin-tail says so, and he knows—he knows.

I wish I might express the great renown
In which this festive fellow and his brown
Helpmeet are held for wisdom by the folks
Who often measure wits with them—Get down!

A hundred pin-tails in a bunch—Great Scott!
They're coming in—no—no—they must have caught
A whiff of this tobacco down the wind—
What did I tell you—Is it Spring or not?

—*St. Louis Post-Dispatch.*

APPENDIX

Ducks—
- River (*Anatinae*)
  - American Wigeon or Baldplate
  - Black Duck, or Dusky Mallard
  - Blue-winged Teal
  - Gadwall or Gray Duck
  - Green-winged Teal
  - Mallard
  - Pin-tail or Sprig-tail
  - Spoon-bill or Shoveller
  - Wood Duck or Summer Duck
- Sea (*Fuligulinae*)
  - American Pochard or Red-head
  - Blue-bill or Greater Scaup
  - Buffle-head or Butter Ball
  - Canvas-back or White-back
  - Cowheen or Old Squaw Duck

Ducks—
- Sea (Continued)
  - Eider,
    - American
    - Greenland or Northern
    - Pacific
    - Spectacled or King
  - Golden-eyes,
    - American or Whistler
    - Barrow's
  - Harlequin or Lord and Lady
  - Little Blue-bill or Lesser Scaup
  - Ring-neck Scaup or Ring-bill
  - Ruddy or Rudder
  - Scoters, Surf Ducks or Sea-Coots,
    - American Scoter
    - Surf Scoter or Spectacle-bill
    - White-winged or Velvet Scoter

The Wood Duck nests in trees; it is noted for its beauty.

The Canvas-back feeds freely on water-celery or eel-grass; its flesh is noted for its excellent flavor.

The Red-head is distinguished from the Canvas-back, principally by the bill being shorter and wider, forehead higher, posterior parts gray, instead of white, and head chestnut red instead of dark reddish brown.

(For concise sketches of the above ducks, giving their range and markings, see The New Canadian Bird Book, by W. T. MacClement, M.A., D.Sc., Professor, Queen's University, Kingston, Ont. Published by the Dominion Book Company, Toronto, Canada.)

The Mallard is the ancestor of the domestic ducks.

A Thrifty Flock of Domestic White Ducks